

Gatewood (J. D.)

VG  
410  
G259<sub>n</sub>  
1893

NOTES  
ON  
NAVAL HOSPITALS, MEDICAL SCHOOLS,  
AND  
TRAINING SCHOOL FOR NURSES,  
WITH  
*A SKETCH OF HOSPITAL HISTORY.*

BY  
J. D. GATEWOOD, M. D.,  
*Passed Assistant Surgeon, United States Navy.*



BALTIMORE:  
PRESS OF THE FRIEDENWALD CO.  
1893.



NLM 00101655 4

# ARMY MEDICAL LIBRARY

FOUNDED 1836

47  
B.

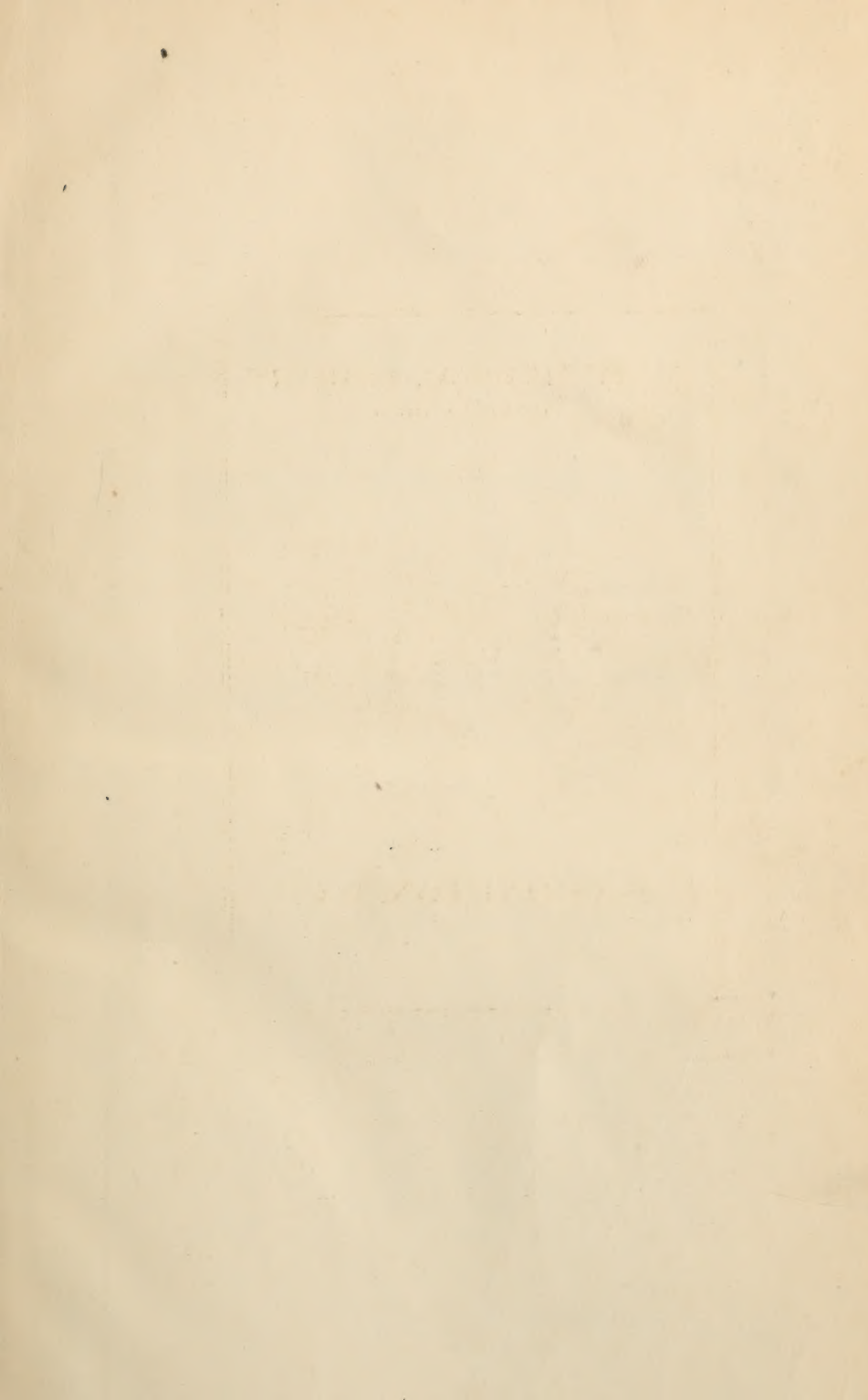


*Hospital*

ANNEX ANNEX

WASHINGTON, D.C.

ANNEX





676957  
20  
37

# NOTES

ON

NAVAL HOSPITALS, MEDICAL SCHOOLS,

AND

TRAINING SCHOOL FOR NURSES,

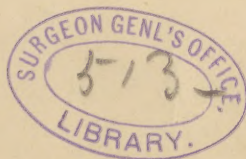
WITH

*A SKETCH OF HOSPITAL HISTORY.*

BY

J. D. GATEWOOD, M. D.,

*Passed Assistant Surgeon, United States Navy.*



BALTIMORE:

PRESS OF THE FRIEDENWALD CO.

1893.



Hospitals, Military

Gatewood

Annex

VG

410

G259n

1893

## ILLUSTRATIONS.

- Fig. 1. Royal Naval Hospital, Haslar.  
2. Royal Naval Hospital, Malta.  
Plate I. Royal Naval Hospital, Yarmouth.  
II. Royal Naval Hospital, Yokohama.  
III. Naval Hospital, Rochefort.  
IV. Naval Hospital, Toulon (basement).  
V. Naval Hospital, Toulon (first floor).  
VI. Naval Hospital, Brest.  
VII. Naval Hospital, Saint Mandrier.  
VIII. Naval Hospital, Cherbourg.  
IX. U. S. Naval Hospital, Portsmouth (second floor).  
X. U. S. Naval Hospital, Boston (second floor).  
XI. U. S. Naval Hospital, Brooklyn (second floor).  
XII. U. S. Naval Hospital, Philadelphia (first floor).  
XIII. U. S. Naval Hospital, Washington (second floor).  
XIV. U. S. Naval Hospital, Norfolk (second floor).  
XV. U. S. Naval Hospital, Mare Island (second floor).  
XVI. U. S. Naval Hospital, Yokohama.

## LITERATURE.

- Reports of the Surgeons-General of the United States Navy from 1866 to 1892. Hygienic and Medical Reports, Bureau Medicine and Surgery, U. S. Navy. 1873 and 1879.
- Barton, Dr. W. P. C., U. S. Navy. Marine Hospitals in the United States. 1817.
- Shippen, Dr. E., U. S. Navy. Naval Asylum of the United States. Reports upon certain English Hospitals, Bureau Medicine and Surgery, U. S. Navy. 1873.
- Dean, Dr. R. C., U. S. Navy. Naval Medical Schools of France and England. Washington, 1876.
- Wylie, W. G. Hospitals, etc. Tr. N. York Acad. M. 1874-6.
- Anizon. De l'origine des hôpitaux. I. de la sect. de med. Soc. acad. Loire-Inf. Nantes, 1847.
- Pre-Christian Dispensaries and Hospitals. Westminster Rev. London, 1877.
- Nightingale, Miss F. Notes on Hospitals. London, 1863.
- Dake, J. P. History of Hospitals; Remains of an Hospital in Pompeii. Med. Counsellor. Chicago, 188c-1881.
- Simpson, Sir J. Y. Was the Roman Army provided with Medical Officers? Edinburgh, 1856.
- Simpson, Sir J. Y. Antiquarian Notices of Leprosy and Leper Hospitals in Scotland and England. Edinburgh, 1841.
- Woodworth, Dr. J. M. Hospitals, etc. Washington, 1874.
- Ballingall, Sir George. Observations on Hospitals. Edinburgh, 1851.
- Lee, Dr. C. A. Hospital Construction, etc. Albany, 1863.
- Sutherland, J. F. Hospitals, etc. Edinburgh, 1882.
- Oppert, Dr. F. Hospitals, Infirmaries, and Dispensaries. London, 1883.
- Armsby, Dr. J. H. Hospitals, their Rise and Progress. Albany, 1852.
- Records Bureau Medicine and Surgery of the United States Navy. British Admiralty Reports.
- Report on the Sick-Berth Staff of the Royal Navy. London, 1884.
- Lefèvre. Histoire du service de santé de la marine militaire. Paris, 1867.



### *A Sketch of Hospital History.*

Many Christian writers and speakers, both lay and clerical, have claimed and are claiming for Christianity the origin of hospitals. They picture in glowing language this birth as springing from the divine injunction to heal the sick, and from the elevating and softening influence upon the hearts of men of this beautiful religion of our land. One is forced to believe that such statements are made without sufficient investigation, as no teacher can afford to build upon any other foundation than that of truth.

The Jews also have made a like contention, though it would appear, upon a little reflection, that all civilizations and all cultured religions have been associated with the growth of that compassion for suffering which, though at times latent, is an inherent quality in man. It is to this growth that we must look for the origin of hospitals, and indeed for much of the effort of the medical mind in all ages and nations to heal the sick and the suffering.

The pages of history are open to all, and though, in looking through the centuries, formless ashes are almost everywhere, shapes may still be found to more than suggest the beautiful thoughts and deeds of the human mind from almost the very beginning of this never-ending tragedy of life.

The study of this question should begin with that of the physician, for no individual or state would evolve the idea of a hospital without the suggestive existence of minds equipped and available for the performance of hospital duties. Yet, in this short paper, the account of the beginning and rise of that interesting and remarkable personage must be very incomplete.

It is true that in remote antiquity there was, in some parts of the earth, a realization that certain diseases were curable. The people of the far and sunny East had, among other dreams, that of the removal of the hand of suffering and death from certain cases. The sick were exposed on couches in the public places, that they might have the benefit of the experience of the masses. It must have been an interesting spectacle—this approaching of the restored ones to the couches of the sick—to hear their complaints, to listen to the statement of symptoms, that those who had been similarly afflicted might impart the method of their cure. Thus so early in the story of life do we find an extensive attempt to use the guiding hand of experience.

The sight must have impressed the minds of men in many different

ways and degrees, and the most educated and observing ones would soon begin to collate methods and results. The empirical led to the question of why, and the question led to the study; and the study of one set of questions by a few always creates a class.

In this case it was a class within a class—the priest-physician. This result is not surprising when one recalls how many centuries were to pass before the mind could be prepared for the separation of medicine from magic, divination and priestcraft.

So it happened that we find the Egyptians writing systematically on medical subjects as early as the 14th century B. C. This medical papyrus in Berlin contains a treatise on inflammation and other subjects, and gives color to the claim of the Egyptians to the invention of medicine. This wonderful people, working out their ideals under the fostering care of their profound religion, soon had a corps of medical men of the sacerdotal order, paid by the state, and as early as the 11th century B. C. there was in that land a college of physicians in receipt of public pay.

The physicians, required by the state to treat the sick poor, practised their healing art in every direction; but it cannot be supposed that they could visit their patients except in particular and grave cases. There were, therefore, establishments set apart by the state, to which the masses could repair at fixed hours. Here we come to the beginning of dispensaries—an interesting fact, as it may be taken as a maxim that the hospital is the development of the dispensary.

The existence of such institutions in that land of high ideals, excites no surprise when one reads on their sarcophagi such remarkable epitaphs as the following: "He succored the afflicted, gave bread to the hungry, drink to the thirsty, clothes to the naked, shelter to the outcast, that he opened his doors to the stranger, and was a father to the afflicted." So this land had long become famous, and a few inquiring minds from the less advanced countries of the North came to seek knowledge.

Thus it is with no surprise that in the early history of Greece we find votive tablets on the walls of the temples. These, while exhibiting the superstition of the age, exhibit also, in some degree, the medical work of the time. They record the history and treatment of individual cases, and are in evidence of the crowds of sufferers who flocked to the temples of Æsculapius at Cos and Tricca, to dream at the foot of the altar and be guided by the advice of their priests.

There is no proof, however, that these particular accounts relate to the poor of that country; on the contrary, they probably express the



thanksgivings of the owners of goods and chattels. Yet they were histories of cases, and, one might say, leaves of the medical books of the time.

In the fifth century B. C. the people of Athens were electing and paying physicians and building dispensaries and hospitals. One of these latter, it is stated, was situated at Piræus. Physicians and surgeons had, however, appeared in the history of Greece and Rome much before this date, and accounts of them will be found scattered through the history of that time. Pythagoras had visited the East ; and Hippocrates had appeared, to become the great clinical observer and writer, and to separate Greek medicine from priestcraft.

The Romans were behind the age in refinement and culture, still one is not surprised to find that at the defeat of the Hetrurians (483 B. C.) the wounded Romans were quartered, by the order of the consul Fabius, at the houses of the senators. It was the custom in those days, and had been and was to be for many years, to place the sick and wounded in the houses of the citizens. However, before the time of Hadrian, there probably were government institutions among the Romans for the care of those injured in the defense of the state, though there seems to be no record of such before that period.

But to return to earlier times and a more imaginative and profound people. In India, the history of hospitals many years before the Christian era is most clear and conclusive. The great king Asoka, who died in the third century B. C., established by royal edict these institutions on the routes of travel throughout his dominions. This edict, it appears, is still to be seen bearing the date 220 B. C. It was cut on a rock in Guzerat, probably by his successor. It states that "they shall be well provided with instruments and medicines, consisting of mineral and vegetable drugs, with roots and fruits ; and that skillful physicians are to be appointed to administer them at the expense of the state."\* These hospitals were founded at that time (220 B. C.) and continued their good work for more than eight hundred years, when their walls crumbled, after the government under which they existed had passed away.

Here one might mention another civilization which goes back to remote antiquity, and whose origin is shrouded in a mystery that provokes the research of our own time. The land of this people was Mexico. Prescott states, on several authorities, that hospitals were found among that ancient and remarkable race. These hospitals

\* *Review of the History of Medicine*, by Thomas A. Wise. London, 1867.

were erected and supported by the government, and, as he expresses it, were "for the care of the sick and the permanent refuge of disabled soldiers." The date when these people constructed their first hospital is a part of the Mexican mystery, but the existence of such institutions in that unknown land is a further proof, if any were needed, that out of all civilizations and all cultured religions comes the growth of that compassion for suffering which is an inherent quality in man.

In the earliest history of the Hebrews the priests were the physicians and surgeons, as has been the case with all races. The Scriptures (Genesis xvii) give the first recorded surgical operation after the Flood, and (Leviticus xiv) show the relation in very remote times of the physician-priest to the people in matters pertaining to the preservation of the public health from the attacks of contagious and infectious diseases. The Bible (Exodus xxx) also mentions the apothecary at an early age, and (2 Kings xx) exhibits the method of treatment in a certain class of cases. It is interesting to observe how early in the history of this ever-memorable people the physician was separated from the priest (Jeremiah viii). These references might be multiplied, but they do nothing towards showing that any provision was made for the treatment of the sick at the public expense. Yet, considering the character of the Hebrews, there must be some record of such provision at some time early in their history.

Returning to less remote ages, it may be observed without surprise, as Rome drew many of her inspirations from Greece, that, 219 B. C., a surgery was provided at the public expense, at the Acilian Crossway, for a certain Greek physician, who came to exhibit the greater advance of his countrymen, and that, as the years rolled by, such places became more common in that land. When Vesuvius threw a pall over the fair city of Pompeii (Aug. 23, A. D. 79) it covered a hospital; and centuries after, when an investigating race uncovered this interesting building, it was found to consist of a large room—the full depth of the house—divided in part into small rooms on each side of a passage. In one of these rooms many surgical instruments, now displayed in Naples, were discovered. These consist of "scalpels, scrapers, elevators, forceps, drills, and a well-made vaginal speculum." Had some benevolent pagan erected this building for the care of the afflicted, or was it a private institution for those able to pay? It was a hospital at any rate, and is worth recording on account of its early appearance in the land of the Cæsars.



As early as the 2d century A. D. there was an organized medical corps in the Roman army, though physicians and surgeons had long accompanied, in a somewhat desultory way, the armed forces of all nations. Xenophon (about 400 B. C.) alludes to them in connection with the Greek armies. As has been said, mention is made of a government hospital for the wounded in war during the reign of Hadrian (117-137 A. D.). In an order of Aurelian (270-274 A. D.) to his soldiers occurs the following: "Let the soldiers be cured gratuitously by the physicians, and let them conduct themselves quietly in the hospitia; and he who would raise strife let him be lashed." In the 2d century mention is made of the *valetudinarium* in camps, and the proper place for this camp hospital is indicated in plans for winter quarters. In the century preceding, it would seem that the wounded were, as a rule, placed in their tents; as generals are mentioned who excited admiration by visiting from tent to tent the wounded under their command.

Tombstones have been found in England and Rome erected to the memory of members of the medical staff of the Roman army in the 2d century, and in Dresden there appears a tablet "discovered in the Elysian fields near *Baiæ*, in the vicinity of the famous *Pontus Julius*, and the station of the imperial *Misenian* fleet, which is to the memory of *M. Satorius Longinus*, physician to the *Cupid*, a three-banked ship." Though this is later, there is reason to believe that at a very early age vessels of war were provided with medical officers, and that the sick and wounded of the navy were received into institutions erected by the government for them, before the time of Hadrian.

There could be no Christianity without effort to help the poor and the suffering. This is a fundamental and essential part of the teachings of Christ. The Christian life began with it, and the care of the poor, the sick and the outcast has been the care of His Church and His people from the beginning. It seems the natural outcome, then, that so soon as the believers in this beautiful religion could acquire property with any reasonable expectation of remaining in possession, the hospital should be made to hold high the flag of the cross. So we learn without surprise that, as the 2d century was about to expire, the Christians seized the idea of hospitals in a practical way, and that their efforts increased as the years rolled by. As early as 300 A. D., several hospitals were founded near *Bethlehem* under the direction of *St. Jerome*.

Some of these buildings were retreats for the poorest and meanest, the most diseased and despised—the leper—and were thus a fit exponent of the Christian teaching. Others were used, together with those on the roads to Jerusalem, for the accommodation of pilgrims and the treatment of the sick.

A few years after this, the influence of Jerome had extended to more distant lands, and his friend, the Roman lady Fabiola, expended her wealth in founding in the city of the Cæsars a house for the special care of the sick. In the Council of Nice, early in the 4th century, hospitals were spoken of with the greatest enthusiasm, as representing a glorious part of the church work.

Indeed, so strongly had their influence been felt, that the very intellectual Julian "The Apostate," in his endeavors to re-establish the religion of his ancestors, availed himself of the power of hospitals, by establishing inns for travelers, the indigent and the sick of all creeds and nations.

The famous hospital of Cæsarea was founded 370 A. D., and the Hotel Dieu in Paris, 600 A. D. Many if not most of these buildings, prior to the 11th century, were utilized to encourage pilgrimages, and thus excite religious enthusiasm; but they were also equipped for the treatment of the sick and the sheltering of the poor. They were also, in almost every instance, church institutions, and were employed, among other things, to propagate and extend the teachings of that church.

As cathedrals and monasteries were constructed to hold high the cross all over the European world, hospitals were built close to them and were under the supervision of the bishops and monks. This consideration is an important one, because it has had much to do with the plan and construction of hospitals. The chapel became the most important part of the hospital establishment, and around this all the other buildings clustered. This was also true of many of the convents and monasteries, and furnishes us with the origin of the block plan. This idea of bringing the sick in close contact with the chapel, where they might hear the masses and see the processions, that their hearts, already troubled by sickness, might be touched by religion, culminated at the building of the Grand Hospital in Milan in 1456, when the Church of Rome was at the height of its power.

It is a matter for interesting speculation as to how long hospitals would have been constructed on that plan, if there had not come the separation of hospital and church. But Christendom was in the next

century to experience that great religious convulsion known as the Reformation, from which was to come a long period of independence in thought and action. Strangely enough, at the same time, Henry VIII of England, that fearfully eccentric "defender of the faith," was confiscating church property and converting certain abbeys and monasteries into hospitals; thus starting in the hospitals of St. Bartholomew and St. Thomas that separation which was to become greater with each succeeding year.

However, much time had to pass before the influence of the old days was far enough removed to allow the scientific mind to grope its way to higher ground. It was not, perhaps, until the eighteenth century, that this air we breathe, and which for centuries the sick had been denied, save in a more or less poisonous state, began to be intelligently considered, and ventilation began to be the cry.

It is thus apparent that it was not until men became free to investigate, and science, born, it may be, under the stimulating hope of a better life, came with religion to bless our race, that improvements in the construction of hospitals took intelligent shapes, and buildings intended for the care of the sick ceased to be grand palatial structures erected for their death.

Let us go back a little, to see how the soldier and the sailor fared during all these years of Christian influence. In the wars under the Cross and against the Crescent, the hospitals of the Church were of course open alike to civilians, soldiers and sailors. These wars stimulated in an unexpected manner the erection of retreats for the sick; for, as a result of the Crusades, establishments for lepers had to be erected all over Europe, and great numbers of them were built even in England and Scotland.

When Christian nations themselves appealed to the sword, the wounded were in great part distributed in the nearest towns and quartered upon the inhabitants. In this we see a repetition of the practice of pagan peoples. It is true that in some Christian countries, the State insisted that the hospitals of the Church should receive the wounded, but it is fair to say that military and naval hospitals have never originated from a spirit of humanity, but have been born of sheer necessity, and from the spirit of science in war.

It seems that the first record of a separate hospital for the wounded erected by a Christian government bears the date of 1575, when, under the immediate influence of Ambrose Paré, and the general influence of writers on military science at that time, a military hospital was built at the siege of Metz.

In 1666, when Colbert, that wise minister of Louis XIV, founded Rochefort and organized the navy of France, necessity created a naval hospital in the little priory of Saint-Éloy. Thus, amidst the sick and dying in the swampy grounds of the new station, France began the lesson which her many naval hospitals show that she learned so well.

In 1694, the partially erected palace at Greenwich, England, was converted into a residence for worn-out and wounded seamen. In the tax for the maintenance of that hospital can be found the suggestion to the American colonies, which eventuated in the establishment of our own marine hospital service and our own naval hospitals.

It was not until 1756 that the modern ideas of hospital construction found anything like an intelligent expression—when a London architect, named Roverhead, designed a naval hospital which was built at Stonehouse, near Plymouth, England. The design was a compromise between the old block system and the present one of separate buildings. This hospital, with its ten detached buildings, began a new era in hospital construction just seven centuries after the erection of the first general hospital in England.

Since the founding of Rochefort by Louis XIV, since the conversion of the palace of Charles II into a harbor of refuge for the disabled warriors of the sea, naval hospitals have sprung up along the coasts of all civilized nations. Born of no religion, the offspring of sheer necessity, they wait for the tocsin of war. As quiet as the smile of peace on the face of Europe, their polished wards for the most part silent and unused, they stand amid trees and flowers, a ready refuge for the heroic lovers of country and of home, or for the victims of ambition, greed or revenge. They stand on sure foundations, and their walls will never crumble until the day of everlasting peace.

### *Naval Hospitals.*

These institutions are not special hospitals, but general hospitals for the treatment of a special class. They present marked peculiarities, which differentiate them from civil establishments. They are situated, as a rule, near navy-yards, that they may be accessible to the sick of the station and of the various ships, and are surrounded by several acres of ground containing trees, shrubbery, flowers and lawns. The number of patients is liable to very great variations, depending upon the movements of the different squadrons and the



varying exigencies of the service. The medical officers are all resident, and have no duty to perform outside of the institution. There are no visiting physicians and surgeons, and consequently no unpaid medical talent.

When a patient is received he has already been under the care of a medical officer, and is accompanied by a hospital ticket stating the diagnosis and history of his case. All the patients are practically under absolute control, and have their movements and dates of discharge determined for them. The sick are of different ranks and grades, thus requiring more or less segregation, and necessitating additional expense to the government, without increased compensation. The sick must be kept until they are fit for service at sea, or for discharge from the navy. This leads to a much lower general intensity of disease than exists in civil hospitals, and to a large number of convalescents and semi-convalescents who may perform light work about the building.

All the naval hospitals of one nation are conducted under the same rules and regulations; and to guard against improper claims for pensions, much work is done on Boards of Survey, and in making out papers and writing journals.

The fact that all the medical officers are permanent members of a corps including different ranks, requiring good records for promotions, and necessitating a life under navy regulations, leads to more caution, and, may be, to less independent action; and while it throws an increased responsibility upon the medical officer in charge, it tends, perhaps, to diminish the originality and ambition of the juniors.

### NAVAL HOSPITALS OF ENGLAND.

The English navy has 711 ships, 58,142 men and 13 hospitals. These hospitals contain 3617 beds, and have daily under treatment about 1100 patients. The sick-berth staff on shore numbers 230, and is maintained at an annual expenditure of \$65,000. At the head of the medical department is the Medical Director-General at the Admiralty.

The following titles designate the various ranks included in the corps: Deputy Inspector-General of Hospitals and Fleets, ranking as rear-admiral (does not serve at sea in time of peace); Deputy Inspector-General of Hospitals and Fleets, ranking as post-captain (does not serve at sea in time of peace); Fleet Surgeon, ranking as commander; Staff Surgeon, ranking as lieutenant of eight years

service; and Surgeon, ranking as lieutenant under eight years service.

Candidates for admission to the Medical Corps enter an open competition before a specially selected board that sits in London. When successful, the candidate is ordered at once to Haslar for special instruction. The hospitals are situated at Haslar, Plymouth, Chatham, Haulbowline, Great Yarmouth (lunatic asylum), Malta, Bermuda, Jamaica, Ascension, Cape of Good Hope, Hong Kong, Yokohama, and Esquimalt.

It is believed that a study of most of these, and of the Medical School and Training School for Nurses, will furnish some desirable information.

*The Royal Naval Hospital at Haslar.*

At this hospital, which is on the water's side, close to Gosport, in view of Spithead, and about a mile and a half from the town of Portsmouth, is concentrated much of the activity of the Naval Medical Service on shore. This one institution comprises not only a large hospital, but also the Naval Medical School, the Training School for the Nursing Staff of the service afloat and ashore, and a depot of medical supplies for the various ships and stations.

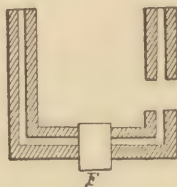


FIG. 1. NAVAL HOSPITAL, HASLAR. *F*, Front.

The buildings (52 feet high) are of three stories, made of brick, supplied with many of the modern improvements and conveniences, and arranged around three sides of a square in two rows, one within the other, leaving the rather narrow space between of 35 feet. Around the inner row on the ground floor is a corridor, which thus borders the large enclosed area, and furnishes an outside means of communication. The fourth side of the square, 400 feet long, is partially occupied by the chapel, which faces the middle or executive part of the building (Fig. 1).

The wards (60×24 feet), which are divided into medical and surgi-

cal, are, as a rule, supplied with open fireplaces, and with windows on both opposite sides. They are thus fairly well ventilated, but are rather too wide for their length, and the ceilings (10 and 12 feet) are too low. They contain as a rule about fourteen beds, and give an average of 1100 cubic feet of air space and 103 feet of floor space to each bed. The walls are colored plaster, and the floors ordinary deal, but some of the surgical wards have teak floors laid in cement. The polish of these, under an application of beeswax and turpentine, adds to the appearance of cleanliness visible everywhere.

The plan of this hospital is a singular one, and presents in more than the usual degree all the grave objections inseparable from the block system. This establishment was built in 1762, at a time when ventilation was being considerably discussed. It is fair to presume that economy prevailed, as well as a tendency to cleave to old traditions.

The grounds in which this building stands extend over 60 acres. They are beautified with lawns, trees, shrubbery and flowers. Some of this could very well have been devoted to more ground space in construction, lessening the number of floors, and separating and increasing the number of buildings. However, this hospital has been continuously occupied for more than a century, and the mortality rate is small even now. This is doubtless due in part to the superior administration incident to it as a government institution, and to the number of patients being as a rule much below the capacity. This latter enables the wards to be more frequently renovated, and allows an additional air space.

This immense hospital has accommodation for 1298 patients, including 68 sick officers; but the average number under treatment is somewhat less than 500. The staff consists of seven medical officers, including an inspector-general, who is in charge. There are several large residences in the grounds near the hospital for most of these, while others are accommodated within the building. The staff seems small when one considers the large amount of work in the hospital and schools. There can be but little time for more than the very closest attention to duties.

An interesting portion of the Haslar hospital is its kitchen, which is situated on the top floor. It is connected with the wards by elevators, which enable the food to be conveniently distributed. But little coal is used in this kitchen. Steam is used to do all the boiling, and broiling is done by gas heat. The crockery upon which the meal is to be served is kept hot on iron tables heated by steam. One can see

that this arrangement must be very satisfactory for several reasons, not the least of which is the absence from the wards of the kitchen odor.

The surgical cases in this hospital are about four times the medical. About one-half of them are venereal cases, which cause the largest amount of invaliding. Several hundred wounds are treated annually, with a very small mortality and a reasonable percentage of invaliding.

The medical cases average about 1000 a year; the principal diseases being rheumatism and pneumonic phthisis. The latter is the most frequent cause of death and invaliding. Many cases of remittent fever reach this hospital, chiefly from the Mediterranean Squadron. A large proportion of the sick from that and the home squadron is received, as well as all the sick from the neighboring dockyard.

A short time ago there was no separate building for contagious diseases, and all such cases were treated in one of the end wards. Possibly, this very unsatisfactory arrangement has been changed. The laundry is in a separate building, and is supplied with modern improvements.

The storehouse is also separate, and it is large, as it is here that many medical supplies are kept for distribution to the various ships and stations. In connection with this work there is a permanent board, consisting of the senior medical officer and others from the hospital staff, for examining and inventing improvements in naval medical appliances. The method of packing and transporting medical and surgical outfits in expeditions on shore, appliances for moving the wounded in battle, improvements in operating cases, medicine chests, ventilating apparatus, water filters and the like, receive special attention in the effort to keep the service supplied with all possible improvements. As soon as anything is approved it is sent to one or more ships in actual service for the only true test of merit.

### *The Naval Medical School.*

The Naval Medical School is for the purpose of giving the medical officers recently admitted to the service, instruction in hygiene, military medicine and surgery, pathology, and all subjects necessary for the most efficient performance of those special duties created by naval life. Instruction was formerly given at Neiley, but, in 1880, the Naval School was removed to Haslar.

The reasons for this change were many. The young naval surgeon was desirous of learning naval duties, while the army school naturally emphasized those pertaining to its own service. Another



consideration, probably more potent, was that nothing stimulates a corps and develops its talents so much as a school taught by itself.

In teaching a class formed of recent graduates in medicine who have built upon a good general education, the older members of the corps are stimulated to greater activity, and a new force is introduced to prevent that stagnation to which there is such a marked tendency. Haslar, with its larger number of cases, many representing diseases incident to naval service, and with its proximity to the great naval station at Portsmouth, furnished a place pre-eminently calculated to facilitate the special instruction desired. Besides, who are so competent to teach the requirements of any service as those who are familiar with them by long experience?

As soon as the graduate has passed the required examination for entrance, and has received his commission, he is ordered to Haslar for this instruction. The course lasts for four months, and though it does not establish precedence in the service, this having been previously determined, it does determine the degree of adaptability and has much to do with the assignment to duty. All the papers and marks of the first examination are sent to this school by the Medical Director-General of the Navy. These must furnish eventually some interesting data bearing upon the competency of any examination to determine that essential quality known as adaptability.

The class, as a rule, consists of about twenty members, more or less. Quarters are provided for them in the hospital, two wards being fitted up for this purpose. They also have a special dining room and a sitting or reception room. A billiard room is also provided, and outdoor sports are encouraged.

The school is well equipped for its special work. The library or lecture room is well provided with the best literature on medical and kindred subjects. The museum, which receives additions from almost all the medical officers in the service, is provided with collections of *materia medica*, *alimentaria*, natural history, pathological and geological specimens, and the appliances used in the service. There are also models of ships, and diagrams showing ventilating apparatus in use, and proposed.

The laboratory contains many microscopes and all the apparatus necessary for bacteriological research, and the analysis of urine, water, soil, food, air, and clothing.

In the wards of the hospital much instruction is given in minor surgery and case-taking. Each member of the class is also made

thoroughly familiar with the various blank forms used in the service, the system of making sanitary reports, and the method of keeping medical journals.

Autopsies are made as opportunities occur, and written reports are made of all pathological conditions.

The work of the day begins in the wards. This is followed by work in the laboratory, and by a lecture in the library. This lecture is often illustrated by various models and diagrams. In the afternoon perhaps the dry dock may be visited, where ships in ordinary and in various stages of construction are inspected from a sanitary point of view, and a draughtsman explains the plan being followed in the construction.

The final examination is made up of oral and written questions and practical work. All written questions have been submitted to the Medical Director-General of the Navy. The possible total mark is 3,000. To the principles of hygiene and practical hygiene are assigned 1,000 each, while journal-keeping, pathology, and military medicine and surgery absorb the other 1,000.

This school is so practical in its teaching, so praiseworthy in its object, and so far-reaching in its influence that it is well worthy of imitation by all nations.

### *The Training School for the Nursing Staff.*

This school was established at Haslar shortly after the medical school. It was the outcome of a report by a special commission made in 1884. The old system of civilian nurses led to the change, as the material supplied by this method was very often exceedingly poor. Now, nearly all the nurses for the navy afloat and ashore are being obtained primarily from the Greenwich Hospital School.

At that school a fair general education is given, and various mechanical trades are taught. After some service at sea, if the boy, who is about 17 years old, desires to become a nurse in the navy, he makes application, and after a rigid physical examination is received at Haslar. Here he finds himself with others quartered in a large ward in the third story of the administration building.

Nine or ten trained female nurses of the highest respectability have been procured to facilitate the education, and he is taught by lectures and in the wards by seeing the things done that he is to learn to do. A certain amount of minor surgery, such as bandaging, is also taught, and when the student is considered qualified, he is sent to sea. After

a cruise he is eligible, if his record be good, for service in the hospitals, and can enlist under special regulations providing promotions and increased pay.

*The Royal Naval Hospital at Plymouth,*

or rather at Stonehouse, was built in 1764, and is next in importance to that at Haslar. It consists of ten separate buildings, or rather eleven, including the chapel, each constituting a separate hospital. These surround a large square laid out in grass plots and gardens. A colonnade ornamented by one hundred and fifty monoliths connects them, and extends around the sides next the court.

There are 44 wards. Each ward contains fourteen beds, separated by over five feet. They accommodate six hundred and sixteen patients, and give an air space of twelve hundred cubic feet to each. The ventilation is good, the buildings are remarkably clean, and the absence of hospital odor is noticeable. The plan of this hospital permits a free circulation of air within the court, a good general ventilation, and a very desirable segregation of patients. House cleaning and painting can be carried on with little or no inconvenience or annoyance.

Generally there are six wards in each building in use for the sick. Quarters are provided for fifty-one sick officers, and room is given for a smoking room and library. The water supply is good, and there are rooms supplied with hot, cold and vapor baths. The water-closets are excellent.

The plan of this hospital is considered the best of any of England's naval hospitals, and it has frequently served as a model.

The total capacity of this institution is considered to be six hundred and sixty-seven, but in 1780 the remarkable number of fourteen hundred and twenty-three were treated here at one time. Probably many were placed under canvas.

It has an easy approach for boats by way of Plymouth Sound, and receives sick, not only from the fleets, but also from the dockyard and marine barracks.

The total number of admissions each year approaches thirty-five hundred. The surgical wards receive about twice as many as the medical. The average number daily under treatment is about three hundred.

In the medical wards rheumatism and pneumonic phthisis are the principal diseases, the latter being the chief cause of death. In the

surgical wards, venereal troubles are in the large majority, these amounting in a year to about one thousand. Syphilitic and gonorrhœal troubles divide the honors. About two hundred cases of injury are treated annually. The loss by death is small, but the invaliding is not inconsiderable.

There are over fifty in the nursing staff, while the hospital staff consists of an inspector-general in charge, a deputy inspector-general, two staff surgeons, and three surgeons. The wards are visited four times daily or oftener by the surgeon having the day's duty, while those in charge of particular wards make routine visits morning and evening. A very good library is provided for the medical officers, and the seniors have separate residences for themselves and families.

*Royal Naval Hospital (Lunatic Asylum) at Great Yarmouth.*

Great Britain has made generous provision for the insane of the navy. Probably there is no institution better supplied and more ably managed than the asylum at Great Yarmouth.

So desirous is the Admiralty that the guiding shall be by the most experienced hands, that there is no rotation of officers assigned to this special work, the inspector-general in charge retaining the duty permanently. All recommendations made by this officer, who has absolute local control, meet with more than the usual compliance, and all requisitions for supplies are considered in a spirit more than usually generous.

No government can really afford to do otherwise: for nothing increases the tendency to cheerful work, or acts so constantly to maintain discipline in a service, as the belief on the part of all that they will be well cared for in sickness, misfortune, or death. This consideration has at times been forced upon the attention of authorities, and has had much to do with improvements in all services in all governments.

The hospital at Great Yarmouth was built early in this century, but was used for a naval hospital only a few years. In days of peace it passed into the hands of the army for use as a barrack. However, when the century was a little more than threescore years old, it became a naval establishment again, and was devoted to the care of those wrecked in mind as well as in body—patients living in a realm of their own.

This hospital is another illustration of the block plan, but in this case there are four two-story brick pavilions arranged around a



square of one and three-quarter acres, with the corners sufficiently open to allow the free circulation of air (Plate I). There is an arched corridor eight feet wide around the lower inner face of each building, and forming their only connection. This plan or arrangement is considered one of the best of any of the older hospitals in the United Kingdom, and though the situation is rather bleak, the selection of this hospital for the present duty is regarded as most wise.

Each pavilion is two hundred and sixty feet long, and, with the exception of the one in front, is divided into two sections by a central structure unoccupied by beds. These sections are subdivided by staircase and nurses' rooms. This results in the formation of eight well separated wards in the pavilion. However, the wards on the lower floor of the rear pavilion have been divided into rooms opening on the corridor, for the use of those too restless to occupy beds near others.

The wards are forty feet long, twenty-three wide, and fourteen and a half high. They have windows on both opposite sides, with beds between. They were originally designed to be occupied by fourteen persons, but the number under treatment is so very much less than the capacity that this overcrowding is made impossible. Indeed, the space unoccupied by beds is so great that it is used for several dining rooms and day wards.

The water-closets are in small towers outside of the line of the wall, and the connections have lattice-work sides, to allow the air to sweep through. The bathing facilities are ample, and include even a Russian bath. This part of the building is not for show, but is used regularly and systematically under the rules of management.

The front pavilion has the second story divided into rooms for the officers under treatment. There is a dining room in connection with these, while a very large parlor on the first floor is set apart for the reception of friends. This lower floor is used, however, chiefly for administration purposes. All the buildings are heated by hot water pipes, and to a certain extent by open fireplaces.

The position of the nurse rooms between wards facilitates their work very much, as, with a suitable division of patients, two wards can often be watched at night by one nurse.

Wherever practicable, a certain amount of ornamentation is used to give as homelike an appearance as possible, and even curtains have not been discarded. This is probably more or less wise as a part of the treatment.

Regulations are strictly enforced in regard to a frequent change of bedding. This change is made immediately when needed in cases confined to bed. Close-stools are cleansed at once, night and day, and frequent visits are made to the restless ones in the separate rooms. There are padded rooms in this institution, but the idea governing the treatment leads to only an occasional use of them.

There is one nurse for eight patients. This does not seem a large allowance. Yet much work is done by the patients themselves. Such occupation is considered a valuable part of the treatment in many cases. It keeps the mind from (as it were) feeding upon itself, and, in the accomplishment of something that can be seen, tends to bring back the interest in life. Trades are encouraged, and places are provided for the pursuit of such pleasant occupations. The nurses are carefully selected, and can be instantly discharged for incompetency or carelessness.

This institution is surrounded by more than nine acres of ground, some of which is divided by walls into exercising courts. Arbors and covered ways have been built for use in bad weather. The outdoor plan of treatment is pursued here whenever advisable, as it often is, and every attempt is made to take away from the mind the idea of prison life.

The kitchen is in a detached building, and is well equipped and managed. The laundry, which is near it, is kept as busy as all such should be. Comfortable houses are in the fore-court of the hospital for the two medical officers comprising the staff. At present there are about one hundred and fifty patients, including forty officers, more or less.

The mortality averages ten per cent, and the recoveries are relatively many. Mania designates more than one-half the cases; and dementia, melancholia, and paralysis of the insane, follow in the order named. The admissions are sufficient to keep the total number under treatment about the same.

### *Royal Naval Hospital at Malta.*

This hospital is situated near the walled city of Valetta, on the north side of the island of Malta, in the Mediterranean Sea. Malta is a sand and limestone formation, eighteen miles long and eight wide, with its long axis approximately northwest and southeast. A range of hills forms its backbone. It is from these that an ancient and leaking aqueduct conveys a limited supply of good water into

Valetta. Cisterns are used for storing this and rain-water; but as these are often polluted by leaks, intestinal disorders and typhoid fever are not uncommon.

The climate is very delightful from October to April, the thermometer ranging from 50° F. to 70°; the atmosphere, under the north winds, fairly dry, and the days almost invariably full of sunshine. This enables invalids and convalescents to live out-of-doors. During this period the rainfall is over twenty inches, but, most conveniently, it falls as a rule during the night, and upon a soil that drains rapidly. Snow is unknown, and the formation of ice is a surprise.

The heat during the summer makes sunstroke not infrequent; while in early autumn the moist sirocco or southeast wind debilitates mind and body, and predisposes to neuralgia and malarial diseases.

Valetta is a terraced city, on the end of a high tongue of land that makes out to the northeast within one of the many indentations of the coast. Its end, however, St. Elmo Point, is so far out as to be on the general coast-line, and forms with Ricasoli Point the entrance to the harbor or bay which is southeast of the city.

Across this bay, half a mile from the city, and on a bold promontory between Forts Ricasoli and St. Angelo, is the largest foreign naval hospital of Great Britain. It has a beautiful site, overlooking the city and harbor, and its Doric two-story stone buildings present an imposing appearance.

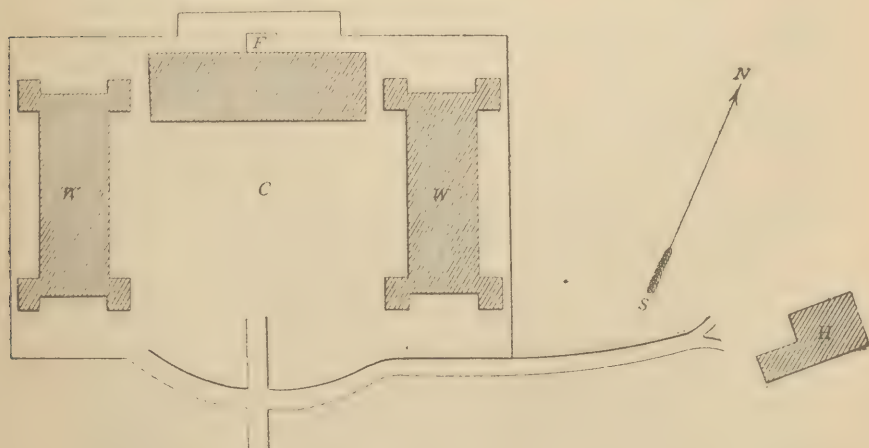


FIG. 2. NAVAL HOSPITAL, MALTA.

*F.* Front. *W.* Wings. *C.* Court. *H.* Inspector's House.

The building that forms the front looks to the northwest, and the detached building on each side extends back perpendicular to the line of the main structure. There is a corridor around the inner face of each, and the enclosed court, which covers an immense cistern, is paved.

The wards are nearly one hundred feet long, twenty-five wide and twenty-two high. There are, however, smaller wards, and many rooms for sick officers. They furnish nearly 1800 cubic feet air space per bed, and are supplied with a fair number of high windows, open fireplaces, and large openings near the ceilings. The ward furniture is reduced to a minimum. The beds are iron, and the mattresses always look new, as they are frequently re-made. There is a good smoking-room and a library.

The bath-rooms are supplied with modern improvements, and the water-closets, though near the wards, are well supplied with seats and water and are easily flushed. The floors of these, being tiled, are easily kept clean and present a good appearance. A small building about three hundred yards from the main buildings, is used for contagious diseases. There is also a large storehouse, which is kept well filled with medical supplies for the fleet.

The nursing staff consists of ten, and these are fairly well provided with quarters. The kitchen and laundry are on the ground floor. The medical inspector in charge has a large residence east of the buildings. This hospital has accommodations for two hundred and eighty patients, including fifty-eight sick officers.

The wards are divided into medical and surgical, and the average number under treatment is about eighty. The number treated annually approximates one thousand—about equally divided between medical and surgical cases. The number of cases of remittent fever treated annually often approaches one hundred; about fifty per cent of these are eventually sent home to recover from the consequent debility. Typhoid fever is not uncommon, there being, perhaps, fifteen or twenty cases each year, with a mortality, it seems, of about twelve per cent. The general death-rate of this hospital is not very large, but a considerable number of invalids are sent home by the troop-ships to escape the summer and early fall.

The authorities of this port are exceedingly sensitive on the subject of epidemic influences, and as a result the quarantine regulations are very rigid. The large number of troops in the garrison, and the importance of the island as a naval station and base of operations,



necessitate, however, the greatest caution. There have been sad experiences with cholera, which is the disease most dreaded, as the island is on the line of travel from the East.

*The Royal Naval Hospitals at Bermuda, Jamaica, Ascension, Cape of Good Hope, and Esquimalt.*

These hospitals present nothing especially worthy of attention. They are, of course, of inestimable importance to the naval service, and from that point of view demand some notice. It is believed that the following short notes will be considered sufficient:

*Bermuda.*—The hospital is situated on Ireland Island, the naval station, and occupies rather high ground, overlooking the water to the west. It is three stories high, and contains four wards, two on the second and two on the third floor. These wards are thirteen feet high, twenty-four feet wide, and sixty long. They contain fifteen beds each, and furnish a little more than twelve hundred cubic feet per bed. Considering the climate, this space should be at least doubled. Ordinarily this is the case, as the average daily number under treatment in time of peace is only thirty, including sick officers, who have rooms on the first floor and are provided with a private dining-room and library.

The whole building is entirely surrounded by broad verandas, which are necessarily supplied with Venetian blinds. There are water-closets and bath-rooms on each floor. As the ground furnishes a rather steep slope the drainage is good. Innumerable gutters conduct off the surface water, while the water-closets have a sewer leading out into the bay.

The kitchen and laundry are in a small detached building; but, unless there has been a recent change, meals are served on small tables in the wards for lack of space for a messroom. It is needless to criticise this undesirable condition of things.

There is no separate building for contagious diseases. Suspicious cases are allowed to develop in the hospital, and then, if necessary, are transferred to the common pest-house on the island. The water supply is rain-water collected in cisterns.

The deputy inspector in charge has a separate house. He and two surgeons comprise the staff. The number of nurses allowed is four. The total number of cases treated annually is about two hundred and fifty. The number of surgical cases is double that of the medical. Venereal troubles form about twenty percent of the total.

Remittent and typhoid fevers are rather frequent. The average number of days under treatment per case of all diseases is nearly fifty.

The climate of the Bermudas is exceedingly pleasant and equable in winter, but in spring, summer and fall the heat is frequently oppressive, though much modified by breezes. The average temperature during this period is about 77 degrees F.

*Jamaica.*—At Port Royal, the naval hospital is an extensive building, but only a part of it is kept in operation or in fair condition. In the early part of this century, events seemed to necessitate a large building for the sick in this part of the world. Its capacity is now considered to be one hundred and twelve, including rooms for twelve sick officers; but the average number of cases daily under treatment is only ten. Five nurses are allowed, as the intensity of disease is liable to sudden changes in this climate. In 1882, forty cases of yellow fever were treated in this hospital.

In the event of any increase of the naval force in these waters, or even of any interference with the cruise to the north in summer, the number of cases and the intensity of the disease would be much increased in this building. As it is, the total number of patients during a year is usually only one hundred and fifty, the medical rather exceeding the surgical cases. About eight percent are invalided, and the loss by death frequently approaches the rather large number of fifty per thousand. This mortality is due in great measure to fevers of various types. Venereal cases number fifteen or twenty annually.

Three medical officers compose the staff. These, in addition to usual duties, have charge of the large amount of medical supplies kept here for the fleet.

Yellow fever receives little attention at the quarantine station across the bay, but smallpox is regarded as the great enemy, demanding constant watchfulness.

*Ascension.*—This building is in Georgetown, a very small naval settlement on the west coast of Ascension Island. This volcanic island has a diameter of six miles. Its surface consists of many hills and mountains, intersected by innumerable watercourses and deep valleys. The mountains frequently attain an elevation of fifteen hundred feet. Much of the coast is formed of rough lava rocks, while the hills and mountains present many well-formed craters.

The hospital is at the extreme south of the settlement, high above

the water, from which it is distant a fraction of a mile. It has accommodations for sixty-five sick, including fourteen officers. There is only one nurse allowed, but the average number of patients daily is but six. About one hundred cases are treated annually. The medical cases are about double the surgical.

As might be expected, venereal troubles are rare, and malarial fevers are very common. These latter are brought by the ships cruising in the rivers and on the coast of West Africa. Indeed, this island is used as a sanitarium. Vessels are sometimes almost entirely deserted, and the crews placed in the barracks on Green Mountain, near the center of the island. From near this mountain, water of good quality is supplied to Georgetown.

At this hospital the mortality is frequently only about ten per thousand; the invaliding, ten percent; and the average number of days treatment per case, less than twenty-five.

*Cape of Good Hope.*—The naval hospital here is small. There are accommodations for eighty patients, including rooms for six sick officers. The average number of patients daily under treatment is twenty-five, and the total yearly is three hundred. The surgical cases are three times the medical. This is to be expected, as venereal troubles are common.

Ships cruising in these waters have few places where liberty can be given. Cape Colony is one of these. About one hundred venereal cases find their way to hospital in the course of a year. Of course, this is a small proportion of the total number of cases.

Ships cruising on the West Coast bring, from time to time, large numbers of malarial cases to this hospital. The death-rate is relatively small, but the invaliding is over eighty per thousand. Summer is the most healthy season, as it is then that the southeast winds prevail.

*Esquimalt.*—This is the smallest of all the royal naval hospitals. It can accommodate but forty patients. The average number daily under treatment is only five, and the total number yearly, less than fifty. Only one or two are invalided during the year, but the average number of days treatment per case is generally over forty. The building is wooden, well-lighted, but poorly ventilated, with two wards. It has ten acres of ground on the west coast and south side of Vancouver Island, and overlooks Constance Cove, a part of Esquimalt harbor.

The surgeon has a house about thirty yards from the main build-

ing. In this there are also rooms for four sick officers. There is a structure for contagious diseases.

Across the Cove and distant a small fraction of a mile is the dock-yard. This is the British naval station in the Pacific.

### *Royal Naval Hospital at Hong Kong.*

This hospital is situated in the eastern suburb of the city of Victoria, on the island of Hong Kong. This island, which is just within the tropics (latitude  $22^{\circ}$  north, longitude  $114^{\circ}$  east), is eight miles long and averages about three miles in width. The long axis is nearly on the parallel. A great part of the surface is formed by barren mountains of volcanic rock which rise in many places over fifteen hundred feet, and are swept during the winter months by the northwest monsoon, and in the summer by the southwest.

The north wind sometimes in January forces the thermometer at Victoria down to  $40^{\circ}$  F., when snow may appear on the mountain tops. The mean annual temperature of the city is  $73^{\circ}$  F. The hottest month is July, when with a mean temperature of  $86^{\circ}$  F. and with a humidity of ten grains per cubic foot, sunstrokes are not uncommon. The coldest month is January, with a mean of  $52^{\circ}$  F. and a humidity of four grains per cubic foot. The highest barometer is in November and the lowest in July.

The wet months are June and July, and the dry months, January and February. The rainfall averages eighty inches, and the rainy days over one hundred.

Victoria, which is on the north side of the island, and one mile from the mainland, has a population of over two hundred and twenty thousand, including two thousand Europeans and Americans. The English rule is strict, so that in spite of the large number of Chinese, cleanliness is observed and epidemics are rare.

The houses are built upon volcanic rock or its derivative laterite, which retains the water during the wet and hot months, and increases the marked tendency to malarial troubles. Turning up the soil is dangerous on that account, but the English authorities have done much, by paving and other sanitary precautions, to improve the general health. Dysentery and diarrhœa have become less common, but smallpox, on account of inoculations, still clings to the Chinese homes.

In the eastern suburb of the city is situated the Royal Naval Hospital, two hundred feet above high water, and overlooking the city



and harbor. It is a fraction of a mile from the coast-line and dock-yard.

The hospital was a private residence, and was bought by the government for £7000. It consists of four buildings, each thirty feet square, built of stone, two stories high, and shaded by verandas. The enclosed square, which receives the breeze through the space between the buildings, is paved. The water-closets and bath-rooms of each building are separated from the wards and placed in offsets.

The upper stories are the four wards, each containing twelve beds, and furnishing thirteen hundred cubic feet to each bed. These wards have high ceilings, windows on both opposite sides, and are lighted by gas. In the lower stories are storerooms, dispensary, nurses' and officers' quarters. The Deputy Inspector in charge has a good residence. He and two surgeons comprise the staff.

The water supply is derived from mountain streams and reservoirs. Provision is also made for the dry season by storing in tanks. The English authorities have done much to protect the water from pollution, and have succeeded in increasing its reputation for being the best on the coast.

The hospital has accommodation for fifty-six patients, including eight officers. During the year, about three hundred patients are treated—the surgical being only slightly greater than the medical. The cases of venereal diseases average about fifty annually. Dysentery, smallpox, and remittent and typhoid fevers are not uncommon. Occasionally cholera claims a victim. The number of cases invalided, averaging about eight per cent, is chiefly from the medical wards. The death-rate sometimes does not exceed one per cent of the total number treated. In the early spring many patients go with the fleet to Yokohama, as the moist summer heat materially delays convalescence.

#### *Royal Naval Sick Quarters at Yokohama.*

This hospital, which was formerly a barrack for English troops, is a plaster and tile building of one story, built on three sides of a rectangle (Plate II). It is situated on a bluff which rises from the sea to the height of one hundred and twenty-five feet. The trend of the coast here is toward the northwest. As the building faces the east, and the sea from which the prevailing winds come, the enclosed court is shut off from the breeze. The length of the front is about one hundred and twenty-five feet, while that of the wings which

extend back at right angles is more than two hundred. Around the inner face of the entire building there is a veranda which is much used in warm weather, and furnishes an outside communication.

This main structure can accommodate over eighty patients. The front and north wings are divided into four wards, each about sixty feet long. These wards have windows on both opposite sides, and have additional ventilation through openings near the ceiling, which discharge near the roof into the air. All these wards are for the treatment of seamen and marines. The south wing is divided into rooms for non-commissioned and warrant officers.

The average cubic space per bed is nearly 1500 feet. The building is heated by stoves and open fireplaces, the latter, of course, assisting much in the ventilation.

The grounds comprise about five acres, ornamented by grass slopes, lawns, groves of trees, and flowers. The locality is a desirable one, and it is on this bluff that most of the foreign residents live, and the United States has established its hospital.

The dispensary and stewards' quarters are two buildings outside of the quadrangle, but facing the unoccupied side. To the south of these, and on the other side of the main gate, are the dwellings for the two medical officers comprising the staff. These houses have a detached kitchen and servants' quarters.

South of the main building, and separated from it by about seventy-five feet of lawn, are the quarters for sick officers. These consist of rooms well fitted up, and usually more than one room is assigned to each invalid.

The mortuary is at the extreme north end of the grounds, and is about 50 yards distant from the main building, from which it is hidden by a grove of trees.

At the extreme southwest corner of the grounds are two separated buildings for the treatment of contagious diseases. Near-by is a spring, a storehouse and a disinfecting chamber. This part of the ground is cut off by a grove of trees. A fire-engine house is near the north wing of the hospital.

The nursing staff consists of seven. These are quartered in a building near the general kitchen, storehouse and coal shed, at the northwest border of the grounds, and distant from the main building about thirty feet.

The method of dealing with the water-closets is one common in the East. They can, almost all, be reached from the outside of the

building, and natives, under contract, remove every night the large earthen jars.

The water supply is from wells, a spring, and a tank in which rain water is stored. All the drinking water is filtered, and in the summer is also boiled.

The total capacity of this hospital is ninety-five (95), including accommodations for thirteen sick officers. The average number under treatment approaches thirty (30). The surgical cases are nearly double the medical. The death-rate is relatively small, and the invaliding, which is influenced by the patients received from the hospital at Hong Kong, amounts to about five per cent. The total number of patients treated annually is about two hundred. Phthisis is common, and the number of venereal cases possibly reaches fifty—twenty-five percent of the total. Malarial fever and occasional cases of smallpox help to make up the record.

The record of this hospital is influenced by the practice of the fleet to cruise north from Hong Kong in the spring. The ships arrive at Yokohama about April, bringing all patients from the Hong Kong hospital who can be safely moved. They return to the coast of China in the fall and carry back with them all who in the intervening months promise to be ready for duty, or who would be benefited by the change. These transfers, however, are chiefly due to the relaxing and debilitating summer at Victoria.

#### NAVAL HOSPITALS OF FRANCE.

The French navy has 378 ships, 75,915 men and 5 hospitals.

The following titles designate the various grades in the medical corps: Inspecteur général, directeur du service de santé, inspecteur adjoint, médecin-en-chef, médecin professeur, médecin principal, médecin de première classe, and médecin de seconde classe.

Each member of the medical corps has obtained his professional education at one of the three naval medical schools at Rochefort, Toulon, and Brest.

The hospitals are situated at Rochefort, Cherbourg, Brest, Toulon, and Saint Mandrier, and offer with the medical schools no uninteresting study.

#### *Naval Hospital at Rochefort, France.*

At Rochefort, on the Charente river, the French made the beginning of a regular organized navy. Here in 1666 Louis XIV, under

the influence of his able minister, Colbert, devoted some of his easily squandered money to the praiseworthy object of founding a naval station. However well chosen the site was from a naval point of view, from that of a sanitarian it was most unfortunate. The work was carried on at the frightful cost of many lives. The swampy ground, when turned up, engendered intense malarial disorders, making a hospital an early necessity. This was established in the old priory of Saint-Éloy at Tonnay (Charente).

Happily there was a village fortunately situated, and abundantly supplied with good water. The old priory was soon insufficient, but it was not until 1683 that the hospital at the new naval station was completed. At that date Tonnay Charente was abandoned and the sick were removed to Rochefort. This new hospital consisted originally of eight wards, each containing fifty beds. These were placed in two buildings, connected by a central structure for administration, two wards on the ground floor of each and two on the floor above. The beds were of wood, and each constructed for two occupants. They were also supplied with green serge curtains. There was additional room in each building for 40 couches—thus making the total capacity 480.

In a short time, however, in spite of the large mortality brought about by the terrible crowding, there was not room for the many demanding admission, and, fortunately, tents had to be used. At one time there were as many as 700 patients. This occurred during the frightful epidemics in the navy during the ten years prior to 1750. It was in this latter year that an addition was made in the form of a new pavilion.

It seems that the large mortality and overcrowding continuing, plans for a new hospital were devised in 1782, and extensive grounds were bought in a more elevated situation outside the ramparts. Here work was begun in 1783 on a hospital to cost 400,000 francs, and to contain 1002 single beds, with 1400 cubic feet of air to each.

In the middle of 1787 the work had progressed so far that these beds were moved in. Iron beds they were, the first used in French hospitals. In 1788 this hospital, the present one (Plate III), was opened with much ceremony, and in three days the old one was abandoned, one may suppose with a sigh of relief; for during the 105 years it had been occupied, 30,000 dead had been carried out of its doors.



*Naval Hospital at Toulon.*

In writing of the naval hospital at Toulon, one feels that the task is more or less disagreeable. The French Government should have destroyed it long ago. It was never suitable for a hospital, and yet it has been used as such for more than a century.

In much less time, even the best-planned hospital is in danger of suffering from hospitalism ; but an old seminary, wretchedly designed, shut off from sunlight and pure air, when used for the treatment of the sick, soon becomes contaminated, and each patient entering its doors encounters a new danger, in spite of the best directed and most skillful efforts of those having him in charge.

The walls of this institution have been standing since 1686, at which time the Jesuits began the education here of chaplains for the navy. A similar enterprise had been initiated the year before at Rochefort. The government, at such an early date, considered it advisable for priests serving in the navy to have special training.

Twenty-three years after this, by the effort of that memorable medical officer, M. Dupuy, a like conviction was instilled into the mind of the king's minister, in regard to the medical officers of the service, and, in 1725, a school was established at Toulon for a like purpose, six years after a similar one had been founded at Rochefort. At that time, however, there was no regular constituted naval hospital at Toulon. The sick of the navy had been treated for some years in the arsenal.

In 1716, this proving inadequate, the system was inaugurated of paying a civil hospital for this service. This, for several reasons, always proves very unsatisfactory, and, as a result, the project of establishing a naval hospital was constantly being discussed.

Time passed, and Toulon increased in importance as a naval station. Economy still prevailed ; but the need becoming more urgent, the king, in 1774, signed the transfer of the house of the Jesuits to the medical department of the service. The clergy and the municipal authorities naturally objected, and their influence was so great that the change was delayed.

In 1783, just after peace with England was signed, the French fleet broke its rendezvous at Cadiz, and many of the vessels came into the harbor of Toulon, having eleven hundred sick on board. There were not accommodations for such a large number, and tents were used for this purpose.

The necessity for a naval hospital was thus greatly emphasized, and the long-delayed transfer was made in 1785. The school and hospital have worked together in this building ever since.

The building has a front five stories high, facing the south, and occupying the shorter parallel side of a trapezoid; the wings going back on the two adjacent sides, and joining a rear building parallel to the front. This rear building is again connected with the front by two additional perpendicular wings, thus dividing the enclosed ground into three small unequal courts—all the wings, and rear of three stories, and the extreme west wing extending beyond the rear structure its own length. Some idea of this plan is obtained by Plates IV and V.

A massive structure it appears, set down in a densely populated city, and separated by narrow streets from the many neighboring buildings. There is a court in the rear, a continuation of the trapezoid, with continuous one-story buildings around it, containing store-rooms, attendants' quarters, and the like; and projecting into it, a building for a pharmacy, dissecting room, mortuary, laboratory, and other offices. But little air stirs within or without such a hospital, and the sunlight shining on its high front reaches but little else.

There are twelve wards, many of them practically being one, as the only separation is an arch. They are one hundred feet long, thirty wide and fifteen high. They contain, as a rule, twenty-four beds each, between and near six windows on each side. There are no additional means for ventilating the fairly great allowance of nearly nineteen hundred cubic feet per bed. The floors are tiles laid in cement, and the walls are whitewashed. A patient, looking out of a window, sees, as a rule, nothing but walls, though he may catch a view of the sun for a short while.

The water-closets are separated from the wards by a narrow passage. They have a fairly good upward ventilation, though requiring frequent disinfection. The drainage is into open gutters, swept by a rapidly moving stream of water.

The total capacity of this hospital is about three hundred, over two hundred and eighty being in wards, and the remaining accommodations, for the officers mainly, being in rooms in the front. These rooms are supplied with open fireplaces, and, fronting on the south, are more cheerful and comfortable. The greater part of the building is, however, heated by stoves.

It is almost needless to say, that in spite of all the skill practised

within its walls, the mortality is great, and patients admitted with slight injuries are liable to develop grave troubles.

The kitchen, though an excellently managed one, is in the basement, directly under a ward. The bath-rooms are also in the basement, but at a considerable distance from the wards, thoroughly equipped, and commanding admiration. The laundry work is done at a distance, in large stone basins supplied with water by a natural stream. There is every attempt made at cleanliness and comfort. The linen is frequently changed, and the beds have each two good mattresses on well-made springs.

The efforts of the staff are worthy, too, of every praise, for they fight a good fight against a constant and ever-present enemy. This staff consists of eight officers, including the *médecin-en-chef* in charge. In addition to other duties, many of these conduct the school.

The whole work is performed in the most excellent manner. Most of the nursing is done by men, but the Sisters have the general supervision of them, as well as the care of special cases. These superintend also the storerooms, kitchen, linen-room, and the general distribution of material.

The Naval Hospital at Toulon is most ably conducted. It could not be otherwise, under men who hold their high position by great merit only. But France considers herself too impoverished to build another, though she listens to the earnest requests and representations of her well-informed medical officers, and continues to expand her wonderful navy and army.

#### *Naval Hospital (Clermont-Tonnère) at Brest.*

Prior to 1666, the sick of the navy were treated in the civil hospital at Brest. At that date, this hospital was destroyed by fire, and an old deserted guard-house was taken for this purpose. The building was small, in a bad situation, and soon overcrowded. As a result of this unfortunate situation, the government was compelled, in 1684, to construct a naval hospital. This hospital contained three hundred beds, but was too small to accommodate the large number requiring treatment, and an addition was built in 1689.

In 1776, this first naval hospital at Brest was destroyed by fire, and it is stated that convicts there under treatment, and still in chains, were burned in their beds. After the fire, there was an immediate necessity to find accommodations for the many sick. An old Jesuit seminary was taken for this purpose—it then being used as quarters

for the marine guard. The sick were put in this building, and, in time, certain additions were made to it, so that it was able to contain five hundred beds.

This seminary was used as the Naval Hospital at Brest until 1834, when the present structure was finished. The corner-stone of the present hospital was laid in 1822, by Clermont Tonnère, the Minister of Marine, from whom it received its name. The site is the same as that of the old building burned in 1776. It is an extensive granite structure, on a plateau back of the city of Brest, and on the left bank of the Penfeld river, commanding a fine view of the city and the roads. It has two stories and an attic, and contains 1200 beds.

It is a pity that this large hospital has such a defective plan (Plate VI). Though symmetrically arranged, its wards bear such a relation to one another that but little light and air are admitted to them. All the wards are parallel, and are connected at one end by a corridor, or rather gallery, to which they are all perpendicular. From this gallery, or rather in the continuation of the wards into it, are the stairs connecting the two stories. The wards are joined in the rear, mostly in pairs, by passages in which are the water-closets, and from which are back stairs connecting the two stories, and also steps leading down into the gardens and courts which the various buildings enclose. The whole comprises a series built upon the block plan, and containing its worst features.

Each ward is over 170 feet long, 26 wide and 15 high, containing, usually, 50 beds, and furnishing over 1200 cubic feet of air space per bed. There are sixteen windows on each opposite side, but no other means of ventilation, save the two doors. The next building across the court is distant less than fifty feet. The beds are iron, and have two mattresses on springs. Strange to say, officers are treated in wards just as enlisted men, there being a ward on the second floor reserved for them. The number of rooms is very small. These are well furnished and contain every convenience, but have to be kept for serious cases only.

There is no separate building for contagious diseases, and at a date not very remote, many cases of smallpox were treated in the wards. The venereal ward is at the extreme end of the building, and this connects through a small room with an annex generally used for other contagious disorders. This annex is continued so as to form a court around the chapel, and contains smoking-room, baths, mortuary and post-mortem room. The kitchen is to the left of the



second entrance, near the quarters of the junior officers on duty, and to the right of this entrance is the administration. The grounds contain a botanical garden, and a promenade bordered by trees. Between these is the building for the medical school.

The sisters, who have special quarters assigned them near the entrance court, nurse special cases and have the supervision of the male nurses. They also superintend the kitchen, laundry, store-rooms, and the like. There is one nurse for every twelve patients. The number of patients treated here is several thousand a year, and the mortality frequently exceeds four per cent. The hospital is in charge of a *médecin-en-chef*.

### *Naval Hospital of St. Mandrier.*

The coast in the immediate neighborhood of Toulon forms, as it encloses the two roadsteads, a curve somewhat like a parabola, with the axis nearly east and west. Toulon is on the north side of the curve, and the hospital Saint Mandrier on the south, distant from the city more than two miles, and overlooking the Grand Roads. Here the ground is high, and the extreme point is commanded by a fort, to guard the entrance to the roads. This fort is 900 yards distant from the hospital, which is sheltered by the intervening hills and the bluff formed by the excavation necessary for a site.

Unfortunately, in the desire to protect the hospital from shells in time of war, so much excavating was done that the wind from the south is entirely excluded from it. In doing this a tremendous amount of labor was required, so that, though the work was commenced in 1817, under the design of M. Raucourt, an hydraulic engineer, it was not completed until 1830. Much of this work was done by convicts. The building erected at that time for their occupation still stands (800 feet long), and is used now for venereal cases, the laundry, and quarters for workmen.

The grounds are 675 yards long and 255 wide, and exhibit by the amplitude the great amount of excavation required. The shore here can be approached by small boats, for which there is constructed a small dock; but the main landing extends out 400 yards (Plate VII).

The main buildings consist of three detached pavilions, one fronting the bluff to the south, and the other two placed laterally nearer the water, and perpendicular to the first. They are each three hundred and sixty feet long and twenty-seven wide, but the breadth is doubled by strong covered balconies on the faces next the court.

These immense buildings, with their three stories, and adjoining grounds containing a botanical garden, beautiful walks and trees, and many detached buildings, including a classical chapel with its dome supported by many Ionic and Corinthian columns, present a glorious memorial of the greatness, gratitude and justice of France. And yet, the never-ending questions: should there be any grand hospitals anywhere?—should not all hospitals be cheaply built, and frequently destroyed?—present themselves even here.

There are 1200 beds within these walls and the many detached smaller structures. Most of them, however, are placed in the wards of the lateral buildings. These wards are 120 feet long, 27 wide and 14 high, and contain 36 beds each, with more than 1200 cubic feet per bed. The floors are tiled, the walls plastered, and the ceilings wofully cut up by arches. There are windows on both opposite sides, but no other means of ventilation. The necessary heat is supplied by three open stoves, symmetrically placed in each ward. The climate, however, is remarkably mild, as is demonstrated by the tropical growth in the gardens.

The front building contains, on the first floor, offices for the administration, and quarters for the chaplains, chief medical officers, and sisters. These last superintend the kitchen, storerooms, laundry, and the nurses. On the second floor of this building are quarters for the junior officers, and small wards for the treatment of sick officers. In the basement or ground floor are the laundry, kitchen, linen room, and the like, and also the pharmacy.

Strangely enough, there is not a water-closet in the whole building. The system employed is that of perambulating closed stools, which are kept, for the most part, in the balconies, and emptied into an earth-pit. This, of course, entails many inconveniences, and makes cleanliness exceedingly difficult.

Associated with this hospital are many detached buildings. In the rear of each lateral building is a series of parallel, temporary, detached wards, accommodating many patients. In front of the administration building are three enormous cisterns, remarkable for the capacity of 10 million litres. In regarding these caverns, one is impressed by the great work of those galley-slaves.

Among the objections to this great hospital are the nearness of the bluff, and the obstruction presented by those very wide balconies to the admission of sunlight to the wards. But this large receiving hospital has been of immense value to France in her many wars; notably,

in the Greek, Algerian, Crimean, Italian, and German campaigns; and to Toulon in her many epidemics.

In 1850, the botanical garden was transferred here from the hospital at Toulon. Every year, its connection becomes closer with the naval medical school in the south of France, and much work is done here now by the students, especially in surgery and clinical medicine.

### *Naval Hospital at Cherbourg.*

Cherbourg was not designated as a naval station until 1781, from which time until 1793, the sick of the navy were treated in a civil hospital. When the large number of workmen in that locality made it impossible for this hospital to receive all the sick, an ancient abbey was placed at the disposition of the navy, which, after many changes, was converted into a naval hospital. Soon this became insufficient, and a new pavilion was added, containing three wards, holding forty beds each. The capacity was thus increased to three hundred beds. The grounds of this hospital contained a chapel, and many small buildings for mortuary, laundry, and quarters for workmen; and also a botanical garden.

As Cherbourg increased in naval importance, additional quarters for the sick were obtained in a barrack. There were disadvantages in having the sick in two establishments so far apart, and, besides, the total number of beds was not sufficient for emergencies. Thus, after much consideration, large grounds were purchased west of the city, for the erection of a large modern hospital to contain 1000 beds. This hospital was not completed sufficiently for occupation until 1870, and a portion of the plan still remains to be carried out. (Plate VIII.)

It consists now of three detached pavilions, arranged like those at Saint Mandrier, except that the front one extends beyond the others, sufficiently for two additional outside rear-pavilions to be built in accordance with the original plan.

The front looks to the north over the dockyard and Grand Roads, so that the rear pavilions have the great advantage of being north and south, thus receiving much of the sun. All the buildings are three stories high, and contain about six hundred beds, though, usually, there are only two hundred and fifty patients. In front is a large garden and promenade. The enclosed court is also laid out as a garden, and is surrounded by a covered way which connects all the buildings, and which can be closed in bad or cold weather.

The main structure in front is used for the same purposes as the corresponding building in Saint Mandrier, while the long, narrow wards are chiefly in the rear pavilions. The wards have polished oak floors laid in cement, and are warmed by stoves with porcelain sides. Besides numerous windows on both opposite sides, there are ventilators near floors and ceilings. Each ward contains forty-eight beds, which are supplied with two mattresses and good springs. There are water-closets, urinals, and sinks near every ward, but well separated from them. A male nurse looks after twelve patients, but as in all French naval hospitals, the sisters nurse special cases and have the general superintendence.

The rear pavilions, which are over four hundred feet long, are distant from each other more than 200 feet. Occupying a part of the space between their rear ends is a large chapel, while in the corresponding space at the other end are the baths. These are most complete, containing in addition to the usual tubs, a swimming pool, a large variety of douches, and shower, sulphur, vapor, and hot-air baths.

The laundry is in a separate building in the west rear corner of the grounds. It is complete in every respect, and has been recently erected at the cost of 300,000 francs. The mortuary is in the corresponding corner on the other side. There is a small wooden structure, rather too close to the main buildings, for the treatment of contagious diseases.

### *The Naval Medical Schools of France.*

A description of the naval hospitals of France, however short, can scarcely be separated from some account of the Naval Medical Schools so closely connected with them. The French naval hospital dates back to the beginning of the regular organized navy in 1666, but the school did not follow until more than a half a century had elapsed. There were several conditions which finally necessitated their establishment. Soon after the foundation of Rochefort it became necessary to have capable medical officers at the various naval stations where so many officers and workmen were being employed.

Considerable care was exercised in their selection, with the result of obtaining good men. The inducements were sufficient to retain them in these positions for many years, as is shown in the case of Ollivier, who was, "1<sup>er</sup> médecin du port de Brest" for more than forty years. These in turn were succeeded by others, all remaining for many years, and attaching importance and dignity to the titles



“Médecin du port” and “Chirurgien-major du port.” Some of these gentlemen represented the best talent in the whole kingdom, and were doctors of medicine of the best faculties in France.

On the other hand, the medical service afloat was made of different material. For some time, commanding officers of ships selected their own surgeons from such material as presented, and they held their places for short times only, and under other great disadvantages. Then a few surgeons were appointed at each port who were available for sea service, but their assistants continued to be appointed in the same manner. At this time there existed in the navy, as on shore, both the physician and the surgeon. The latter was, as a rule, illiterate, and had obtained his small knowledge as an apprentice in the office of some surgeon in the large cities.

The former, though the better educated, was generally one of little worth, who, in spite of the disadvantages of life at sea, resorted to the navy as a means of livelihood. In their education they had also imbibed a contempt for the surgeon as a class. Out of this condition of things only dissatisfaction could come.

The various medical officers of the ports soon became aware of the great need of improvement. A short time after M. Dupuy was appointed “1<sup>er</sup> médecin” of the port of Rochefort (1712), the establishment of a naval medical school became the great object of his life. This gentleman, who was a graduate of the faculty of Toulouse and a member of the Academy of Sciences, repeatedly urged upon the government the necessity for such institutions.

Disheartened by no failure, he finally accomplished his object, and succeeded, in 1722, in having a suitable building erected for the purpose, at which time this school was opened at Rochefort, with much formality. The success of the project was soon assured, and its influence became so apparent that two other schools were soon established, the one at Toulon, in 1725, and the other at Brest, in 1731.

These schools have commanded the admiration of the world ever since; and in spite of the many successions of kings and of the Reign of Terror itself, they have always been fostered and prized by the French people.

M. Dupuy is marked in naval history by his thorough grasp of a subject so important to the future welfare of his country. In England the purpose of the Naval Medical School is to *complete* the education of their assistant-surgeons acquired at the various medical schools of the country, but in France the object is to *begin* that edu-

cation, and carry it on to a high grade of perfection. These schools have been so ably described by Medical Director Richard C. Dean, of the United States Navy, that all the remaining remarks upon this subject may be considered as a résumé of his remarkably complete report.

The student is taken as a youth over eighteen years of age, and impressed, from the beginning, with naval methods. He must be a citizen of France, without physical fault, and have arrived at the dignity of an A. B. or a B. S. Dismissal from one school for deficiency in studies, or infractions of discipline, bars him from the other schools and from naval life. There are two divisions in the school, and promotion from one to the other is determined by examination at the end of one year. This is a good arrangement, as two failures (one year interval) to pass from the lower to the higher division, leads to dismissal and rids the school of the trouble of working and spending money upon unsatisfactory material.

The professors are permanently attached to the school. They are assisted by "fellows" who have arrived at that dignity after a special examination. These latter are liable in time to sea service. Every subject is lectured on three times a week, and each course is completed once in two years. Thus, after two years study, the successful candidate becomes an assistant-surgeon; and, after two years more study, if successful, a surgeon of the second class.

An assistant-surgeon is not considered prepared for service at sea, as he has been examined only on the following subjects:

1. Anatomy, performance of dissection (oral).
2. Pharmacology, extemporaneous pharmacy (oral).
3. Minor surgery, application of apparatus and bandages (oral).
4. General pathology and semiology (written).

After this examination he remains under instruction for another two years, with the exception of six months at sea, and is then examined for promotion to the grade of surgeon of the second class. This examination is on the following subjects:

1. Anatomy and physiology (oral).
2. Materia medica and therapeutics (oral).
3. External pathology, operative surgery, obstetrics (oral).
4. Internal pathology, hygiene, legal medicine (written).

Having passed this examination, he is granted six months leave for the purpose of procuring the degree of "doctor of medicine" from one of the faculties of France. The government defrays all the expenses entailed by this leave in the event of success, and in return

demands a written contract to remain in the naval service for ten years.

The examination for promotion to the grade of surgeon of the first class is also held at the school, and embraces the following subjects:

1. Physiology (oral).
2. Clinical medicine (oral).
3. Operative surgery, obstetrics, performance of one surgical and one obstetrical operation (oral).
4. Naval hygiene, pathology, a report on medical jurisprudence (written).

The whole curriculum of studies is as follows:

1. Legal and administrative medicine.
2. Clinical medicine, medical pathology.
3. Materia medica and therapeutics, toxicology.
4. General and naval hygiene.
5. Clinical surgery, surgical pathology.
6. Operative surgery.
7. Anatomy and physiology.
8. Obstetrics, diseases of women and children.
9. Chemistry.
10. Pharmacy and medical physics.
11. Natural history (medical), pharmacology.
12. Descriptive anatomy.
13. General pathology and semiology.
14. Minor surgery, apparatus and bandaging.
15. Extemporaneous pharmacy, chemical manipulations.

To teach these various branches there are various amphitheaters, a library, a botanical garden, and a museum of natural history, pathology and anatomy. In addition to all this, the wards of the hospital form the great school, and in them clinical instruction is given in the most thorough manner.

The final examinations for each grade are conducted at each school by professors from all of them. The examination is presided over by the director of the school at which the examination is held. He is assisted by one professor from that school, who has been determined by lot. The other two come, one from each of the other schools, and have been selected in the same manner. All the questions to be asked have been chosen by the medical council in Paris, from the number sent from all the schools. These questions, in a sealed envelope, with each question also sealed, and those for the

different grades separated, are sent to the board of examiners after they have met in session.

The candidate to be first examined is determined by lot, as well as the question to be first asked. All other candidates then withdraw, and are placed under guard in a distant room. As soon as the question is answered, the same question is put to each of the others, the order being determined by lot. Thus a separate question is drawn at each day's session. As a candidate answers, each professor places after the name his estimate of the value. When the answer is written, it is placed in a sealed envelope, and is read aloud next day by the candidate in public. After the last question has been answered, there is prepared, in secret session, a list of all the candidates, with the marks of each professor opposite his name. This list is sent to Paris, where a superior commission is appointed, to consider these marks and make the final classification. The minimum for each grade is 200, and 20 is the maximum for each question. No one can serve as a member of the examining board who is, in any degree, a relation or a connection of any student. An alternate, selected by lot, is available for any such emergency. This remarkable method demands no criticism here, but suggests many. At any rate, it precludes all prejudice, favoritism, and mercy.

Before leaving this subject, something must be said about the daily routine. The work begins at eight o'clock, before breakfast, and starts with an hour's clinic in the wards, followed by an hour's lecture. The lecture is generally from manuscript. Attendance is obligatory, and the subjects to be lectured upon, with the day for each, are posted on the bulletin board every week. After the lecture comes the hour for breakfast, followed by another lecture lasting an hour. After this, there are three hours passed in the dissecting-room or laboratory. This routine seems to demand a great deal from young men before breakfast, but is in accordance with the French method of living. There are generally over 100 students at each school, and of these, about 10 per cent come up to the requirements.

### NAVAL HOSPITALS OF THE UNITED STATES.

The history of the navy of the United States begins as early as October 13th, 1775; but there was no attempt to establish naval hospitals until February 26th, 1811. However, much before that date, provision had been made for the treatment of the sick and disabled seamen of both the navy and merchant service.



When the partially erected palace of Charles II at Greenwich, England, was, in 1694, converted into a naval hospital, the tax for its maintenance was levied, not only at home, but also in the American Colonies, where each seafarer was required to pay a portion of his earnings to support an institution so far distant. The collectors were educating the American people then, and continued to educate them for many years, in a system which they themselves were to adopt after a century, with its many dark days, had been added to the past. 1776 came, and a new flag was unfurled, which was soon carried at mastheads rapidly increasing in number.

By July 16th, 1798, the number of American seamen had become so great, that Congress passed an act for the relief of the many sick and disabled. By this act, twenty cents per month were deducted from the wage of each seaman in a merchant vessel of the United States, and directors were appointed to control the expenditure of this hospital fund at the various ports. This was the beginning of the Marine Hospital Service, under which the sick of the sea could find refuge in various civil hospitals designated by the directors. On March 2d, 1799, the act of the previous year was extended so as to embrace the naval service; the Secretary of the Navy being authorized to deduct twenty cents each month from the pay of every officer, seaman, and marine. The benefits and advantages were to be the same as those accorded to the crews of merchant vessels of the United States.

However, as might have been predicated, it was soon apparent that the navy could not, without many disadvantages, depend upon civil hospitals for the treatment of its sick. The men, passed from the control of their own officers, lingered in hospitals for considerable periods, and in many instances finally disappeared. It soon became the opinion that the good of the naval service demanded that it should have its own hospitals. Accordingly on February 26th, 1811, Congress passed a law establishing naval hospitals.

By this law, the Secretaries of Navy, Treasury, and War were appointed, for the time being, "Commissioners of Navy Hospitals," and to them the hospital tax accruing from the navy was to be paid, together with all fines imposed upon officers, seamen, and marines.

This fund was augmented by \$50,000 appropriated out of the unexpended balance of the marine hospital fund; this being considered the amount belonging to the navy from payments made prior to the passage of the act. These commissioners were authorized to procure sites for hospitals, and, where suitable buildings could not

be purchased with the sites, to cause such to be erected. They were also required "to provide, at one of the establishments, a permanent asylum for disabled and decrepit navy officers, seamen, and marines."

The act goes on further to say, that when any officer, seaman, or marine shall be admitted into any hospital, that that institution shall be allowed one ration per day during his continuance therein, to be deducted from his account, and that when any one is admitted who was previously entitled to a pension, this, during his continuance therein, shall be paid to the commissioners, and deducted from the account of the pensioner.

Little, however, was done for ten years by these commissioners. The Secretary of the Navy, Mr. Hamilton, had hospital plans prepared by Mr. Latrobe, and was very anxious to execute, as soon as possible, the very desirable and very plain law. The other two commissioners were not in sympathy with the plans of the man knowing best the urgent needs of the service of which he was the head; the opposition being based upon its permanency and stability. The importance of the subject increased by time; its advocates becoming more earnest each year. The good of the service demanded a better provision for the sick than was made by the inconsiderable establishments at some of the navy-yards. These were, in some cases, cast-off buildings and wretched hovels, destitute of every necessary comfort. The method of caring for the sick was constantly undermining the discipline of the service, and diminishing the spirit of cheerfulness and content.

It was more than ten years after the passage by Congress of the "act establishing navy hospitals," that the commissioners, changed by the various political currents, began to carry out the real intent of the law under which they were created. Then, land was purchased at Boston, New York, Philadelphia, and Norfolk, and appropriations were made for buildings. The difficulty with which the three commissioners worked together, led, shortly after this (10th July, 1832), to Congress investing the Secretary of the Navy with all their powers. After this the work progressed more rapidly, and the navy was soon provided with hospitals in keeping with its promising future. As the history and description of each hospital are found below, it is only necessary here to give some idea of their internal organization and government.

The book of "Instructions for Medical Officers of the United States Navy" gives most of the required information. The medical officer

in charge of a naval hospital is responsible for the care and treatment of the sick, and for the discipline, cleanliness, and economy of the institution, which it is his duty to keep always in an efficient condition; and to this end he shall exact from his subordinates, employés, and patients, a proper obedience to his orders and to the laws and regulations of the navy. Medical officers, and all persons employed in the hospital, shall perform such duties as may be assigned to them by the officer in charge.

No changes, except in cases of emergency, which shall be immediately reported to the bureau, shall be made in the hospital buildings, furniture and grounds—such as destroying or removing trees, or disturbing the soil around them; and no bills for purchases or repairs shall be contracted without permission of the bureau.

The medical officer in charge shall inspect all medicines, provisions, supplies, etc., that may be received, or shall cause them to be inspected by a subordinate medical officer, who shall report to him their condition, etc. A record of the inspection shall be entered on the daily journal. He shall direct the medical officers in charge of the wards to present their case-papers to him once a week for examination, and will assure himself that they are accurately and carefully kept.

The officer in charge of the hospital shall detail a medical officer who, in addition to such professional duties as may be assigned him, shall perform the duty of "officer of the day" for twenty-four hours, commencing at 10 A. M. The officer of the day shall make a tour of inspection through the wards, kitchens, mess and other rooms occupied by patients and employés, upon going on duty at 10 A. M., and during the afternoon at a different hour daily, and finally at night after the patients are in bed. A list of patients and employés who have received passes shall be furnished him, as early as practicable every morning, and all patients and others will be required to report their return to him.

A journal shall be kept by him, which he shall sign at the end of his term of duty, at 10 A. M.; in which he shall make a brief record of the following points, which are to be noted at the time of occurrence: the condition of the wards, kitchens, mess, smoking and other rooms, at each inspection; the condition of the meals served, as to quality and quantity; the names and diseases of the patients admitted, and the places from which they are received; the names, number of days subsisted, and disposition of patients discharged, and whether

the necessary papers in each case are correct and complete; the names and conditions of patients and employés who have returned, or who have overstayed their leaves; the confinement and discharge of offenders; the reporting and detachment of officers, or their going upon and returning from leave; the record of inspection of all articles received; the object and finding of all boards of survey; and finally such other matters occurring during his term of duty as it may be desirable to record.

Medical officers in charge of wards shall be held responsible for their order and neatness, and for the good condition of all within them. They shall exercise a personal supervision over the comfort and welfare of the sick, visiting them at least twice daily, and oftener in severe cases; and they shall assure themselves that their directions as to medicines, dressings, regimen, etc., are accurately and promptly carried out. They will, personally, take the temperature of patients, and will never allow this duty to be performed by the nurses.

Patients should be accompanied, upon admission, with hospital tickets, but in cases of emergency they may be admitted without this paper, when the medical officer shall report the fact to the commandant of the station, with a statement of the emergency, and cause the necessary hospital ticket to be supplied.

Convalescents may be detailed for light service, but shall not be retained in the hospital for that purpose after they are fit for duty.

No patient in hospital shall be entitled to any service except that of the regular hospital attendants, nor shall any one except medical officers on duty, patients and employés of the hospital, be subsisted or lodged, without permission of the bureau.

In hospitals the following diet table will be followed for patients when practicable, but the allowances to attendants' messes may be varied at the discretion of the medical officer in charge, provided the value of the ration be not exceeded:

## BREAKFAST.

## DINNER.

## SUPPER.

*Sunday.*

Coffee (oz. 1),	pt. 1.	Roast beef,	oz. 12.	Tea (oz. $\frac{1}{2}$ ),	pt. 1.
Bread,	oz. 6.	Bread,	oz. 4.	Bread,	oz. 6.
Butter,	oz. 1.	Potatoes,	oz. 10.	Butter,	oz. 1.
Stewed mutton,	oz. 4.	Other veg's,	oz. 4.	Sugar,	oz. 1.
Sugar,	oz. 1.	Pickles,	oz. 1.	Milk,	oz. 2.
Milk,	oz. 2.				



*Monday.*

Coffee (oz. 1),	pt. 1.	Mutton,	oz. 12.	Tea (oz. $\frac{1}{4}$ ),	pt. 1.
Bread,	oz. 6.	Bread,	oz. 4.	Bread,	oz. 6.
Butter,	oz. 1.	Potatoes,	oz. 10.	Butter,	oz. 1.
Beef hash,	oz. 4.	Other veg's,	oz. 4.	Sugar,	oz. 1.
Sugar,	oz. 1.	Pickles,	oz. 1.	Milk,	oz. 2.
Milk,	oz. 2.				

*Tuesday.*

Coffee (oz. 1),	pt. 1.	Boiled beef,	oz. 12.	Tea (oz. $\frac{1}{4}$ ),	pt. 1.
Bread,	oz. 6.	Bread,	oz. 4.	Bread,	oz. 6.
Butter,	oz. 1.	Potatoes,	oz. 10.	Butter,	oz. 1.
Mutton hash,	oz. 4.	Other veg's,	oz. 4.	Sugar,	oz. 1.
Sugar,	oz. 1.	Pickles,	oz. 1.	Milk,	oz. 2.
Milk,	oz. 2.				

*Wednesday.*

Coffee (oz. 1),	pt. 1.	Beef soup,	pt. 1.	Tea (oz. $\frac{1}{4}$ ),	pt. 1.
Bread,	oz. 6.	Pork,	oz. 12.	Bread,	oz. 6.
Butter,	oz. 1.	Beans,	oz. 4.	Butter,	oz. 1.
Beef hash,	oz. 4.	Bread,	oz. 4.	Sugar,	oz. 1.
Sugar,	oz. 1.	Potatoes,	oz. 10.	Milk,	oz. 2.
Milk,	oz. 2.	Pickles,	oz. 1.		

*Thursday.*

Coffee (oz. 1),	pt. 1.	Roast beef,	oz. 12.	Tea (oz. $\frac{1}{4}$ ),	pt. 1.
Bread,	oz. 6.	Bread,	oz. 4.	Bread,	oz. 6.
Butter,	oz. 1.	Potatoes,	oz. 10.	Butter,	oz. 1.
Pork and beans		Other veg's,	oz. 4.	Sugar,	oz. 1.
(warmed),	oz. 6.	Pickles,	oz. 1.	Milk,	oz. 2.
Sugar,	oz. 1.				
Milk,	oz. 2.				

*Friday.*

Coffee (oz. 1),	pt. 1.	Fish,	oz. 12.	Tea (oz. $\frac{1}{4}$ ),	pt. 1.
Bread,	oz. 6.	Bread,	oz. 4.	Bread,	oz. 6.
Butter,	oz. 1.	Potatoes,	oz. 10.	Butter,	oz. 1.
Fish chowder,	oz. 4.	Other veg's,	oz. 4.	Sugar,	oz. 1.
Sugar,	oz. 1.	Pickles,	oz. 1.	Milk,	oz. 2.
Milk,	oz. 2.				

*Saturday.*

Coffee (oz. 1),	pt. 1.	Bean soup,	pt. 1.	Tea (oz. $\frac{1}{4}$ ),	pt. 1.
Bread,	oz. 6.	Stewed mut'n,	oz. 12.	Bread,	oz. 6.
Butter,	oz. 1.	Bread,	oz. 4.	Butter,	oz. 1.
Beef hash,	oz. 4.	Potatoes,	oz. 10.	Sugar,	oz. 1.
Sugar,	oz. 1.	Other veg's,	oz. 4.	Milk,	oz. 2.
Milk,	oz. 2.	Pickles,	oz. 1.		

A special diet list shall be kept for each ward, which shall be revised and corrected every morning by the medical officer in charge of the ward.

*Admission of Patients.*

The following forms are to be observed:

(a) When the hospital ticket is found correct, endorse and file it, with accompanying papers relating to the case; if defective, return to the medical officer signing, when he is at hand; or otherwise, through the bureau.

(b) Enter name, etc., as follows: (1) In the general alphabetical register of patients, which is the permanent hospital record, for future reference. (2) In the abstract of patients.

(c) Open case-paper.

(d) If seaman from the receiving ship or other vessel, send ration notice to commandant of receiving ship as paymaster's notification; if a marine from the neighboring barracks, send the ration notice to the commanding marine officer through commandant.

*Discharge of Patients.*

No person shall be discharged from the service for physical disability, without having been previously surveyed by a board of medical officers. A copy of the report of survey and of any other paper relating to the patient, shall be appended to the case-paper, which shall be signed at its conclusion, or on detachment of the officer, by the medical officer in charge of the patient's ward. Case-papers will be verified by the signature of the medical officer in charge of the hospital. When a patient is discharged from hospital, the fact shall be entered upon the register of patients, and also upon the case-paper, which is then to be filed with the hospital ticket attached. The ration notice shall be forwarded through the commandant of the station. On every Monday, a report of the sick for the preceding

week shall be made in triplicate, one copy of which shall be sent to the commandant of the station, one to the bureau, and the other retained for the files of the hospital, as a basis for the report of the following week.

*Medical Department, United States Navy.*

By an act of Congress, 31st August, 1842, reorganizing the Navy Department, the various bureaus were created, and the management of the medical department was vested in a single head, denominated Chief of Bureau of Medicine and Surgery. It was required that this officer should be chosen from the surgeons of the navy. On September 1st, 1842, William P. C. Barton, M. D., was appointed the first chief of that bureau. On March 3d, 1871, the title of Surgeon-General of the Navy was conferred, and with it the relative rank of Commodore.

At the same time the relative ranks of the officers of the medical corps were designated as follows: Medical Directors, with relative rank of Captain; Medical Inspectors, with relative rank of Commander; Surgeons, with relative ranks of Lieutenant-Commander and Lieutenant; Passed-Assistant Surgeons, with the relative ranks of Lieutenant and Lieutenant (Junior Grade); and Assistant Surgeons, with the relative rank of Ensign. With the exception of the Medical Directors, these officers serve both afloat and ashore.

Candidates for admission to the medical corps are examined at the Naval Hospital, Brooklyn, New York, by a specially selected board. Permission to appear before this board is obtained from the Secretary of the Navy.

Attendants on the sick at the various hospitals are male nurses, selected from civil life by the medical officer in charge of the institution. They are paid from \$15 to \$25 per month, and are subject to instant dismissal for incompetency or misbehavior. The number employed is about one to every eight patients.

The naval hospitals of the United States are situated at Widow's Island, Maine; Portsmouth, New Hampshire; Boston, Massachusetts; Brooklyn, New York; Philadelphia, Pennsylvania; Washington, District of Columbia; Annapolis, Maryland; Norfolk, Virginia; Pensacola, Florida; Mare Island, California, and Yokohama, Japan. The total capacity of these is 823 beds, and the daily average number of patients is about 225. In the navy are 10,500 officers and enlisted men.

*Naval Hospital on Widow's Island, Maine.*

On Widow's Island, Penobscot Bay, Maine, is a naval hospital, specially constructed for the quarantine and treatment of the sick with yellow fever. It is a novel hospital, in that the permanent building is chiefly for administration, while the wards are portable Ducker hospitals, packed away until necessity shall require their use.

The history of this institution is rather peculiar. In 1885, the Isthmus of Panama was the scene of considerable naval activity, as the United States was under the necessity of having a force on shore and a squadron in that locality. The presence of so many ships in a part of the world so often the home of yellow fever, induced the idea that it would be wise to provide a suitable refuge for infected vessels. This situation was the exciting cause of the construction on Widow's Island, but a strong predisposing cause is found in the proximity of the old quarantine station near Portsmouth, New Hampshire, to sections frequented by summer visitors.

The island had been purchased by the government for lighthouse purposes, but, as it was not required for that use, it was offered to the Navy Department to meet the supposed necessities of the time. It contains 15 acres, has a height of 100 feet above sea-level, is bounded by East Rockland Bay and Fox's Island Thoroughfare, and is 12 miles from Rockland and 2 miles from North Haven. The place could scarcely be more segregated, but, in time of need, special transportation of supplies from Rockland could be easily provided for.

At the time of its selection it was almost barren, being destitute of trees and shrubs, and even water. However, the deep water near at hand, where the largest ships could swing at anchor, and the situation so far north in a summer climate opposed to the spread of the yellow scourge, made it a desirable place for the purpose. A well, furnishing potable water, was soon made by boring, and a temporary wooden building was constructed in 1885, under the design and direct guidance of Surgeon A. C. Heffenger of the navy. There was fortunately no occasion for its use, but as the idea still prevailed that some future time might develop a pressing need for such an establishment, Congress appropriated \$50,000 for a permanent structure.

This was begun June 4th, 1887, and completed, together with the pump-house and mortuary, on the following February. A wharf was also constructed on the southwest side of the island, where the land slopes gently to the water. All the rest of the coast is precipi-



tous. By the approval of the Surgeon-General, Surgeon Heffenger furnished the design, and the work was also carried on under his supervision.

The following description was written by him in 1888:

“The plan of the present hospital embraces a finished basement of eight feet, and two stories of twelve feet each. Its dimensions are ninety-six by fifty feet. The basement is built of granite, with granite water-table; and the walls are built of brick, with a thickness of sixteen inches. It is placed on the highest point of the island, founded upon solid ledges, and facing the southeast. A wide verandah extends across the entire front and for some distance on either side of the hospital. The roof is of slate, and is surmounted by a cupola and flagstaff.

In the basement are the laundry, ironing room, drying room, disinfecting room, and numerous storerooms. On the first floor are the dispensary, reception-room, officers' dining-room, patients' dining-room, attendants' dining-room, kitchen and pantry. On the second floor are three officers' wards, three wards for men, a linen room and two attendants' rooms. A dumb-waiter extends from the basement to the second floor. In the north corner in the basement, and upon both floors, is a room fitted with lavatory, water-closets and bath-tub; thus there is but one soil-pipe in the building, and that runs direct from the basement through the roof, where it is properly covered with a ventilating cowl. All the plumbing and plumbing fixtures are exposed, and have been thoroughly tested.

Two water-tanks, with combined capacity of three thousand gallons, are placed in the attic, and water is pumped into them from the artesian well by a Rider caloric engine of six-inch cylinder, and deep well pump. To ensure a sufficient volume of water for using this pump, a reservoir six feet in diameter and twenty feet deep was blasted from the upper end of the well tube, the capacity of which more than equals that of the combined tanks. A two-inch distributing pipe runs from the tanks down to the basement, and a fire-plug with hose attachment is provided on each floor and in the basement. The tell-tale and overflow lead into the laundry tubs.

The drainage is excellent; the main sewer pipe running down the southwest slope from the rear of the hospital into Fox Island Thoroughfare, where it terminates below the level of ebb-tide. A manhole and trap are provided just outside the building, and again immediately above high-water mark.”

"The barren and altogether unprepossessing aspect of the island rendered it advisable to make such improvements upon the grounds as the limited amount of the appropriation would permit. A number of walks were laid out and graveled. About two hundred and fifty spruce, fir, and hardwood trees were planted on the borders of these walks, and upon other parts of the island, and a lot for a cemetery was ploughed up, leveled and planted in grass seed. The ground immediately around the hospital was graded, terraced, covered with sea gravel for some distance, and sown in grass seed outside the margin of gravel.

The hospital furniture was received and put in place during June, 1888. It is plain in design, of excellent quality, and ample for the probable requirements of the station. The iron bedsteads with woven wire mattresses manufactured in Hartford, Conn., merit special notice. The pneumatic tubes and bells which connect all parts of the hospital are also worthy of special mention.

The provision of Ducker Portable Field Hospitals is of great value to this station, as it makes it possible, under any ordinary demands, to treat all contagious cases outside of the main hospital, which can thus be reserved for treatment of non-contagious cases, and administrative purposes.

A small dead-house, with a cast-iron revolving autopsy table and concrete floor, is placed some distance from the other buildings, and affords excellent facilities for post-mortem examinations.

The station as now equipped, including main hospital building and Ducker pavilions, accommodates fifty patients, and this number could be doubled or quadrupled by simply adding more Ducker pavilions."

### *U. S. Naval Hospital at Portsmouth, New Hampshire.*

There are two islands close to the Maine coast-line and the city of Portsmouth, New Hampshire, that are used by the United States for naval purposes. They are called the Puddington Islands, and are connected by bridges with each other and the Maine mainland, to which State they once belonged. They were a part of the discovery of Martin Pring in 1603, charted by John Smith in 1614, and included in the grant to Sir Fernando Gorges in 1639.

In 1800 the government purchased from William Dennett the one nearer the mainland, for \$5500. The other to the south, known as Seavey's Island, did not become the property of the government until 1866, when the 26 owners parted with it for \$105,000.

The navy-yard was established on the one first bought, soon after the purchase. There was, however, no local provision for the care of the sick until 1834, when a small vacant frame building, constructed in 1802, was repaired and furnished for that purpose. It could accommodate but ten patients with any comfort, though occasionally 15 were treated there at one time. In 1865, certain alterations were made, increasing its capacity to 25. It was then, however, more than 60 years old, and soon the necessity for a new building became apparent. This subject was agitated from year to year, until in 1888, the Surgeon-General reported the old hospital beyond repair, and in every respect unfitted for the treatment of the sick.

Congress, on March 2, 1889, and on June 30 of the next year, appropriated \$43,000 for the construction and furnishing of a new building. Work was commenced in September, 1890, and the building, with its various outhouses, was finished in a year, and commissioned on December 21, 1891, when the old hospital was abandoned. The old frame structure still stands in its dilapidated condition—one of the few wooden relics of the early days on the island.

The new site is on the west shore of Seavey's Island. This island was selected because it was important to have the hospital outside of the yard, and yet easily accessible. Next the Piscataqua river, and between it and the road connecting the bridges in the north with Fort Sullivan in the south,  $3\frac{1}{2}$  acres were set apart for hospital purposes.

The building, which is about 83 feet long and 54 wide, is constructed of brick, and fronts the south, with its length north and south. It consists of a cellar, 3 stories and an attic, under a pyramidal roof, surmounted by a ventilating cupola. The front projects for two stories, forming a small tower, on each side of which are short enclosed piazzas.

The hospital, though new, is built on the corridor plan, there being a single central hall 10 feet wide on each floor, connecting the back and front. On each side of this are placed the wards and rooms. Little more need be said about the arrangement, as a reference to the plan submitted will be sufficient. The three wards are on the second floor. Sick officers and the resident medical officer have quarters on the third floor. The first floor is given up to administration, the dining-room and kitchen. (Plate IX.)

The pitch of the first floor is 10 feet; of the second, 12 feet 3 inches, and of the third, 11 feet. There are beds for 26 patients, with 1060

cubic feet of air space to each. In the officers' wards the air space is 2970 cubic feet for each.

The floors of all the wards are of Georgia pine, on an under-flooring. The windows have double sashes, this being necessitated by the severe winters. They are provided with hinged lights. There are also 3 brick air-shafts extending the whole height of the building and connecting with the ventilating stack, while registers are near ceilings and floors, and cold air ducts from the exterior lead to the bases of the radiators. The radiators, which are placed at convenient points throughout the building, are supplied with steam from the boiler-house in the rear. Gas for lighting purposes is made on the premises.

The water-closets are at the back of the building, as well separated from the wards as the ground plan permits. They are supplied with overhead tanks and all modern improvements. The bath-rooms near by are well furnished. The traps to all fixtures have ventilating ducts, which finally discharge above the roof. The sewer system is an independent one, and empties into the adjacent waters.

The source of the water supply is the ponds formed by damming the overflow from the springs near the center of the island. The boiler and laundry house is about 30 feet in the rear. The laundry has a concrete floor and wood ceilings, and is supplied with the modern machinery of the Troy Laundry Company. The dead-house is at the northwest boundary of the grounds, near the water.

The staff consists of a surgeon and a passed-assistant surgeon. The former is also the surgeon of the navy-yard, where he is provided with a residence. The total number of patients treated last year was 86.

Seavey's Island contains 105 acres of uneven and hilly ground, well suited for farming purposes. The surface soil is, however, generally shallow and covers granite. The views from the island are extensive and attractive. The winters are long and severe, while the summers are short and mild. Storms are not uncommon, and fogs are not rare in summer. July and August are the warmest months, the thermometer perhaps reaching 85° F. February is the coldest month, as then the mercury may be 10° or 15° below zero F. The mean annual temperature is 44° F. The location is free from malarial influences, but rheumatism, neuralgia and bronchial disorders are common. However, the climate seems conducive to a long life, though typhoid fever is not uncommon in the city, and cases of phthisis last, as a rule, but a short time.



*Naval Hospital at Chelsea, Massachusetts.*

As the policy of the government during recent years has been toward the concentration of the work of construction and repair of ships at two yards only, the navy-yard at Boston has, for the time being, diminished somewhat in importance, and, with it, the naval hospital, where the average daily number under treatment last year was only 17.

This hospital is beautifully situated at Chelsea, a suburb northeast of the city of Boston, and separated from it by the Mystic river, spanned at this point by a substantial bridge, across which street cars closely connect the thickly populated suburb with the city proper. It is near the Boston end of this bridge that the navy-yard lies, less than a mile from the hospital. The hospital grounds are on the left bank, and occupy the angle formed just above the bridge by the Mystic and Mill rivers.

On September 22, 1823, this tract, consisting then of 115 acres, was purchased for \$18,000 from Dr. Aaron Dexter, of Boston, by the Secretary of the Navy, Secretary of the Treasury and Secretary of War, representing the government as "Commissioners of Navy Hospitals." This tract has been reduced to nearly 75 acres by several encroachments, but this has been since the hospital was commissioned on January 7, 1836.

The hospital then was much smaller than it is now, as on July 14, 1862, \$71,500 were appropriated by Congress for its extension and repair. Adams and Jenkins were the contractors, who, completing the new portion by March 2, 1864, and thus furnishing room for the sick, were able to remodel and repair the old portion by June 1, 1865. While this work was going on, Morris Tasker & Co., of Philadelphia, completed for \$18,000 the arrangement for heating the new portion, and for the laundry and culinary work, placing the boiler and laundry in a detached building in the rear.

Considerably prior to these changes, the surgeon's house was built. This is a large residence, 250 feet south of the hospital. It was erected at a cost of \$11,500, this amount appearing in the appropriation bill for the year ending 1857.

The hospital is a large granite house, devoid of any special hospital plan, 148 feet long and 70 wide, with pyramidal roof, attic, three stories and cellar. It is on a slight elevation, and faces the river to the southwest, from which it is distant about 100 feet. The

first floor is only slightly above the ground level, so that there are only one or two short steps at the main entrance under the projecting portico. The portico is 27 feet long and 13 wide, extends to the level of the second floor, and has four columns of the Doric order placed in front. The first story is divided by a central hall,  $23\frac{1}{2}$  feet wide, connecting the front and rear entrances. On the north side of this hall are the dining-room ( $21\frac{1}{2}$  by 66 feet), well lighted by seven large windows, the dispensary, the kitchen, and two storerooms. On the south side are dining-room for the junior medical officers on duty, the administration office, reception room, storeroom, and linen closet.

From the rear of the main hall a stairway ascends to the second story. The pitch of all the stories is 14 feet, and the arrangement of the 2d and 3d stories is the same. There is a hall ward,  $23\frac{1}{2}$  by  $26\frac{1}{2}$  feet, supplied with one window and containing eight beds, all against dead walls. To the north are two wards of nearly the same size and arrangement as the preceding one, and a large ward running crosswise and corresponding with the dining-room below. This ward,  $21\frac{1}{2}$  by 66 feet, with a window at each end and five on one side, contains 20 beds—ten against the dead wall and ten between the windows opposite.

The nurse rooms, bath-rooms, and water-closets are between the long and smaller wards. The bowls in the water-closets are porcelain, and well flushed from overhead tanks. The closets containing no windows are lighted by gas, and ventilated by an air-duct leading to the roof. Their very objectionable situation is inseparable perhaps from the general plan.

To the south of the main hall, on the two upper floors, are large well furnished rooms for sick officers and resident medical officers. The bath-room and water-closets are between the end rooms. Of course, all these various rooms and wards are arranged along intersecting halls or corridors. The accompanying plate (No. X) shows the arrangement on the second floor, and more than suggests the obstruction to the free circulation of air throughout the building.

It is useless to make any comment on the many beds against dead walls, and the many intersecting corridors. Every hospital should, of course, be considered with all the beds full, as this is the situation which best tests its plan. Here there are 100 beds with from 985 to 1090 cubic feet air space and from 71 to 78 feet floor space to each; but, as the number under treatment at one time rarely exceeds 30,

these figures mean ordinarily but little. The beds in the wards are iron, and supplied with a hair and a wire woven mattress.

The floors are painted soft pine, and the walls are calcimined. However, in the third story hard pine floors have been laid, and the walls are painted plaster.

In addition to the windows and doors, ventilation in some of the rooms and wards is assisted by shafts leading to the roof. There is, however, no complete system of ventilation.

Electric call-bells are placed throughout the building, and electric lights are now being introduced—the work to be completed by July 1st, 1893. Gas is supplied by the city, as is the case with water, which comes from the reservoir of the Mystic Water Company. The water is abundant and of excellent quality. The sewer system is complete and independent; it discharges into the adjacent waters.

The Walworth system is used in heating the hospital, the surgeon's house, and certain other rooms, such as the smoking-room in the wooden annex. The steam heat is, however, difficult to control, and this in the variable climate leads to too great variations in temperature.

The naval hospital grounds surround those of the marine hospital, which are off to the east and comprise ten acres. These ten acres were inadvertently given by Congress to that service. When it was discovered that they, a part of the original purchase of 115 acres, had been paid for by money held in trust, \$50,000 were added to the hospital fund in lieu of them.

The original purchase was further reduced by several acres taken at the beginning of the Civil War for ordnance purposes. It is not clear how the Bureau of Ordnance acquired this ground, nor how many acres are claimed.

The acreage left to the hospital is, however, most ample; it, indeed, represents quite a farm. Much of it contains many fruit trees, while about the building and in other sections are ornamental trees, shrubbery and flowers.

Off to the west, a quarter of a mile from the hospital, and in the low and moist ground near the point where the two rivers join, is the smallpox hospital, completed on 25th April, 1869, by Geo. W. Clark, of Chelsea, at a cost of \$8000. To the north, and at the same distance, is the cemetery. This is separated from the hospital by a line of hills 100 feet high. These hills, on whose slope the hospital is really built, shelter the building from the strong northeast winds which often prevail.

Nearer the hospital, about 40 feet from the north end, is the brick mortuary completed in 1865. There are also near-by many coal sheds, a new barn, stable, carpenter shop, conservatory, hotbeds, paint-shops, and other outbuildings. The grounds are enclosed by water and by brick walls.

The staff consists of a medical inspector and two assistants. During the last twenty years the total number of patients treated has been nearly 3000.

Until recently this was the only naval hospital on the Atlantic coast of the United States entirely free from malarial influences. This renders it a desirable place for the treatment of the many malarial troubles originating during the southern cruise of the home squadron.

*U. S. Naval Hospital, Brooklyn, New York.*

This establishment increases daily in importance as the navy gathers strength, and the navy-yard near-by becomes more and more the center of great activity in construction and repair. It is situated in the city of Brooklyn, in the State of New York, and, facing the west, overlooks the navy-yard, half a mile distant, and separated from it by a narrow intervening strip of the city. The grounds, now enclosed by high brick walls, comprised, originally, 33 acres, but, on July 2, 1890, the United States Government sold to the city a little more than two acres.

These 33 acres were the hill portion of the Schenck farm, purchased on May 1, 1824, together with the mansion and farm buildings, for \$7650. In this purchase the government was, of course, represented by the "Commissioners of Navy Hospitals," while the parties of the first part were Sarah and Jane Schenck, widows, and Jacob and Ida Harris and Isaac and Mary Ann Harris. On April 19, 1833, the State of New York ceded to the United States its jurisdiction over this property. However, at the time of the purchase, the mansion and farm buildings were made ready for the reception of the sick of the navy, then treated in a house rented by the government, and were so employed until 1838, when the front or main portion of the present hospital was first commissioned. In 1840 the wings were added and the original plan completed. At the same time was constructed the building to the east of the north wing, which is now designated as the laboratory, but was originally used as a pest-house.

The hospital is on an elevation 56 feet above high water, and the wall in front, separating the grounds from the city, is distant 200 feet,



while that to the south, where the main gate is, is 360 feet away. The building, fronting 197 feet, and consisting of full basement, two stories and attic, is constructed of marble from the Sing Sing quarries, originally white, but now a decided gray. The ground plan is like a modified H, the wings perpendicular to the front, and 49 feet wide, extending *back* 73 feet, but to the *front* only 11 feet. These forward extensions are really a part of the front or main building, the intervening space being occupied by an imposing portico 11 feet wide and 100 feet long, which, with its 8 square columns, supports a frieze and cornice suggesting remotely the Doric order.

Though the columns extend from the ground, the floor of the portico is on a level with the first floor. As the ground immediately in front of the building is higher than that in the rear, the basement is partly covered in front; and the broad stone steps leading up to the portico spring from a terrace. This terrace is paved with stone flagging, and extends along the whole front, and for more than thirty feet on each side, where from each end steps ascend to a side entrance on the first floor.

The paved court, which is open to the east, is 100 feet from wing to wing, and 60 feet deep; this being also the depth of the main building, which has, at the back and thus toward the court, 8 square columns similar to those in front, but supporting piazzas 100 feet long and 10 wide for each floor. As the court is on a level with the ground floor, it is in the rear that the hospital presents its full height.

A corridor nearly 10 feet wide extends the whole length of the mid-line of the front on every floor, and is joined by similar ones from the wings. On each side of these are the rooms and wards. Thus it is seen that this is a corridor hospital on the block plan. The different stories are reached by very broad staircases within the front where each wing joins. The staircase wells allow with the corridors a free communication of air throughout the building.

All the sick, except commissioned officers, are on the second floor. Here are found 15 wards of varying sizes for the treatment of enlisted men, and rooms for laboratory employés and sick warrant-officers. The wards, which are divided into many classes in accordance with the character of the cases, are in the south wing and the front. The rooms are in the north wing, though there are rooms for nurses in both wings, and there is an operating room in the south wing. This latter is on the south side of the corridor. Its floor, 15×11 feet, is of hard pine shellaced, and its height is 17 feet, this being the pitch of

both stories. It contains one large window, and is bountifully supplied with instruments and all things necessary for successful work ; but, opening upon the corridor, its atmosphere is that common to the whole hospital (Plate XI).

The largest wards are, of course, the four in the front extensions. These are  $27 \times 21$  feet, and two are supplied with four windows each, and the inner two with three each. These windows are necessarily on adjacent sides ; thus, as is the case throughout the building, leaving dead walls ; and like all the windows, though large, not extending nearer the ceiling than 3 feet. All the other wards are about  $15 \times 21$  or 22 feet, and have two windows in each on the same side. The floors are, for the most part, painted soft pine, but recently a few hard pine floors have been put in. The walls are painted plaster.

The beds are iron, and supplied with a hair and also a wire-woven mattress. Near each bed is a locker, a chair, and a small carpet-rug. The number of beds in a ward varies with the size of the ward, but as a rule, the allowance of floor space per bed is 65 feet, and the cubic space 1100 feet. As this hospital, with accommodations for 125 patients, has most of the time less than 50, the floor space and air space given each patient are ordinarily most ample. However, occasionally the number of patients reaches 100, and probably hereafter this will occur more frequently. The rooms on the second floor of the north wing are chiefly for sick warrant-officers. These are fairly well furnished, and have associated with them a dining-room and reception-room.

On the first floor there are in the south wing, quarters for the three junior medical officers on duty ; in the north wing, a counting-room, quarters for the apothecary, and 5 rooms for sick commissioned officers, with reception and dining-room attached ; in the front are administration offices, board rooms, a mess-room for resident medical officers, 3 rooms for sick commissioned officers, a chapel and library, and a dispensary. The rooms for sick officers are well furnished, and have a homelike appearance.

In the basement, which has a height of about 10 feet, and where the corridors are paved with stone flagging, are smoking and mess rooms for the men, kitchens, carpenter shop, storerooms, and quarters for laborers. The mess-rooms are two, one being for those on full diet.

There are water-closets and bath-rooms on each floor, off the corridors at the ends of the wings ; those on different floors being imme-

diately above one another. The bath-rooms are  $8 \times 16$  feet, while the rooms for water-closets are about half the size. Some of the bath tubs are porcelain and others are copper. There are also appliances for various special and medicated baths. The water-closets are supplied with seats, porcelain bowls, flushed from overhead tanks, and urinals. The floors are concrete, and there is a large window in each room. The doors of these rooms open directly on the corridors, but the water supply for flushing is unlimited, and the sewer connections are well guarded by traps.

There are in the building a dark room, and electrical appliances for surgical and medical treatment. Fireplaces are in almost all the wards and rooms, but the hospital is heated by steam and hot air supplied from the engine and boiler house in the rear. The same machinery that drives heated air into the building in winter, supplies cool air in summer. The means of ventilation are, besides doors, windows, and chimneys, air shafts in the walls, and roof ventilators over the staircase wells.

The system of sewers is extensive and complete, not only for this building but for all others in the grounds. The manholes and vents are open, and the highest point of the system is connected by a ventilating duct with the chimney of the steam building. The pipes connect finally with the sewers of the city.

The water supply is the same as that of the city, connection being made with the city mains. This allows many fire-plugs about the grounds. From the city is also obtained the gas which lights the whole building. However, the work of introducing electric lights has been begun and will soon be completed.

Walking about the grounds, one notices the laundry close against the engine and boiler house, 50 feet in the rear of the hospital. This laundry is relatively new and is supplied with every necessary apparatus. There is also the long stone building like the wings, and built on the same line as the north wing, though 60 feet in the rear. It is 100 feet long and 50 wide, was constructed in 1840 at the same time the wings were built, and was known then as the pest-house. It is now called the Naval Laboratory, though it is simply a large reception and storehouse, with basement and two stories, from which medical supplies are distributed to the various ships and stations. It is in charge of a medical director, who has a commodious house in the north division of the grounds. This division is made by a high brick wall, extending approximately east and west, about 80 yards

north of the hospital. Between the wall and the hospital are the mortuary, chapel, and a two-story building for contagious diseases. This latter building, called the smallpox hospital, is 200 feet from the main building to the northeast. Near it is a disinfecting chamber.

The medical director in charge has a large residence in front of the north end of the main building. It faces the south, is forty-five feet square, with a large back building and has two stories.

120 yards in rear of the hospital is the cemetery, whose register now numbers over 1250.

The staff of the hospital consists of a medical director, a surgeon and two assistant-surgeons. The number of patients is, of course, liable to great variations. The mortality ratio has also been very variable, at times comparatively small, and at others relatively large.

*U. S. Naval Hospital at Philadelphia, Pennsylvania, and Naval Home of the United States.*

Immediately after the passage of the law of 1811, entitled "An Act establishing Navy Hospitals," it became necessary for the navy to take charge of its sick on shore. It was, however, very poorly equipped for such work, as there was not under its control a suitable building anywhere for such an undertaking. Necessity demanded something in the way of sick quarters at all the navy-yards. At the old navy-yard on the Delaware, in the city of Philadelphia, a very small building was appropriated to this use. It was represented in 1813 as a wretched hovel, destitute of every necessary comfort for sick persons, and calculated to hold eight patients. At that time it was holding twenty-four, and the thought of each was simply to gather strength enough to desert. This state of affairs demanded immediate correction, and a frame building was accordingly erected by order of the department issued the same year. This was regarded at the time as only a temporary structure, but it was not until the 26th of May, 1826, that the commissioners created by the act of 1811 made a move to carry out in this locality the real intent of that law. Then the purchase was made of the "Abbot lot," the site of both the Naval Hospital and the Naval Home of to-day.

This lot of 23 acres is situated on the left bank of the Schuylkill river, in the western section of the city of Philadelphia. It cost the government \$17,000, and, as a part of the Pemberton estate of 150 acres, has a long and interesting history. It is sufficient here to



state that the Pembertons bought their "plantation" from the Penns in 1735, built a large square brick house and several brick outhouses on it, beautified it, and lived outside the city in good old colonial style. The British officers, attracted by the beauty of the place and its natural advantages, occupied it frequently during the war of the Revolution. Surgeon Thomas Harris, of the United States Navy, many years afterwards, influenced by the same qualities, impressed upon the "Commissioners of Navy Hospitals" the desirability of acquiring possession of the lot of 23 acres, then the property of the Abbot family and containing the buildings.

By the act of 1811 the commissioners were required to provide at one of the hospitals a permanent asylum for disabled and decrepit navy officers, seamen and marines. It was decided to carry out here in Philadelphia this provision of the act. Accordingly, immediately after the purchase in 1826, the buildings were made ready to receive the sick and also a few beneficiaries, and the hospital at the navy-yard was abandoned. Then, under Mr. Strickland as architect, and Surgeon Harris as superintendent, the work of constructing the asylum was begun. It was called "Asylum," as it had been so designated in the act establishing it, but soon there were many who regarded the selection of that term as unfortunate. The difficulty of making asylum and home synonymous was insuperable, but it was not until July 1, 1889, that the official designation became "Naval Home."

In 1832 the building was under roof, but the Hospital Fund was so nearly exhausted that Congress, in July of that year, had to come to its relief by appropriating \$33,900. So the work progressed, and toward the close of 1833 certain parts of the building were occupied. The old buildings were then deserted and the sick and the beneficiaries were transferred to the new home. A short time after this the other buildings were demolished and the bricks utilized to improve the walks. Work continued on the asylum, and it may be said that the building was not really finished until 1848. Over \$195,000 were expended in construction, and Congress appropriated \$93,000 of this sum, the remainder having been supplied out of the Hospital Fund. It remains now to give a short description of the building and grounds before passing on to the Naval Hospital, which is of much more recent construction.

The grounds, in a great part surrounded by high brick walls, approximate the trapezoidal shape. The longer (1226 feet) of the

nearly parallel sides is formed by the Gray's Ferry road, and the shorter (583 feet), to the west and near the river, by Southerland avenue. The side (947 feet) nearly perpendicular to these is at the south, and the long (1364 feet) side at the north. The home fronts the southeast and the long parallel, from which it is 223 feet distant. It is a building 380 feet long, composed of a central structure, with a pavilion on each side, entering into the formation of the front and ending in a transverse building. A basement, two stories and an attic, broad verandas on the two floors of the wings, broad stone steps with a marble colonnade for the central structure, fine marble stairways in the interior, and vaulted masonry ceilings, and a domed chapel, give a general idea of the building.

The beneficiaries number over 100, and each has a small room, three good meals a day, and a pound and a half of tobacco and a dollar each month. All the laundry work is done without any expense to him, and every reasonable convenience is supplied. Twenty years service, or serious disability in the line of duty, allows admission. On entering, all pensions must be allotted to the hospital fund. Before the building of the present hospital, the home was, of course, as much a hospital as an asylum. For hospital purposes the second floor of the south pavilion, the rooms in the transverse building and the attic were employed.

It was in this Home that the germ of the Naval Academy originated, as it was under its first "Governor," Commodore Biddle, that a class of midshipmen was formed, and professors were employed to teach them. The students were those preparing for examination, and the class was renewed year after year, until the founding of the Naval Academy in 1845.

The Naval Hospital is in the same enclosure, 350 feet in the rear of the Naval Home, and 225 feet from the shorter parallel side of the grounds near the river. It is, with the exception of the stone basement, a brick building. It is 320 feet long, faces the southeast, and consists of a basement, two stories, and attic with mansard roof. It was designed by John McArthur, an architect, in 1865, when the appropriation for its erection was made. The work was begun in 1866, with Dobbins Bros., Philadelphia, as contractors. After an expenditure of \$172,500, the hospital was commissioned in July, 1868.

It consists of a central structure and two wings, all entering their full length into the formation of the front. The wings are pavilions,

over 100 feet long, ending in transverse buildings, and containing the wards,—the central structure being the administration portion. The wings, denominated northeast and southwest respectively, were originally alike, but in 1886 the former was divided into rooms for beneficiaries from the "Home"; but these rooms have never been occupied by them. Indeed, no one lives in that part of the building but the chaplain of the Home, who has his quarters in the second story.

The southwest wing remains as it was originally designed—on each floor is a long ward, 81 by 24 feet, and in the transverse portion a smaller ward, 21 by 20 feet, with nurse-rooms, and in the rear and across a short corridor, water-closets. The floors are all soft pine painted, and the walls are painted plaster. The full height of the ceilings is 15 feet. There are 14 windows in the large ward, placed symmetrically on the opposite sides, while in the small ward there are seven. Twenty beds are in one ward, and five in the other. These are of the usual pattern, and are supplied each with a hair mattress on a wire-woven base. There are the usual lockers and chairs and electric call-bells. As the other wing is not used, the total number of beds is just fifty—twenty-five on each floor. The air space for each bed is 1400 cubic feet. The hospital was, of course, designed for fifty additional beds in the other wing.

This total of 100 can be increased 50 by using the wards under the mansard roof. This space is not used for the sick, as the ceiling of the long ward is low. However, in the transverse portion of the mansard are two rooms, 20 by 21 feet, with fairly high ceilings. These at present are used, one for a bag and hammock room, and the other for microscopic and photographic work. In the basement of the pavilion are a smoking-room corresponding to the long ward and two storerooms.

The central structure occupies 118 feet of the front, and has a depth of 74 feet. This does not include its further extension of 52 feet in an addition consisting of a basement and one story, containing in the former the kitchen, and in the latter the dining-room and several pantries. In the basement of the main or central portion, there are, besides this kitchen, many storerooms, and quarters for employés. On the first and second floors are the administration offices, quarters for resident medical officers and for sick officers, reception-rooms, dining-room, dispensary, diet-rooms, bath-rooms and water-closets. Under the mansard roof are an autopsy room,

and a ward 28 by 45 feet, now used as a lumber-room. In the rear of these, and separated by the corridors, are quarters for the servants. (Plate XII.)

The entire building is lighted by gas and abundantly supplied with good water from the city. As the water pressure is insufficient, tanks have been placed under the roof, which are kept filled by a steam pump. Steam for heating purposes is supplied from the boiler house in the rear, where also is the laundry, well supplied with all necessary appliances. There is good natural ventilation, and consequently it is seldom necessary to use the artificial means provided. These consist of openings near the floors, through which hot air comes, heated in its passage by the steam pipes contained in brick casings, and openings near the ceilings, through which the air is drawn into the chimney of the boiler-house by a fan. The sewer system is not altogether satisfactory, as it is too closely connected with that of the city, as there is a large sewer running through the hospital grounds which has an objectionable manhole not far from the building.

To the north of the Home is the residence of the governor of that institution, and to the south is the residence for the senior medical officer of the Hospital. There is a garden south of the hospital, and various outbuildings, but no separate place for contagious diseases. The dead were once buried in the grounds, but the government now owns a place in one of the city cemeteries.

The staff consists of a medical director and two junior officers. The beneficiaries from the Home furnish most of the patients. These are placed on the lower floor; the paralytics and other helpless cases in the small ward. These old men, already near their end, furnish, of course, a large mortality, though they have the advantages of an almost model hospital. From July 1st, 1868, to December 31, 1892, there were 5346 persons treated in this institution. Of these, 648 were discharged from the service or transferred to the Government Hospital for the Insane, and 392 died. As 303 of these were beneficiaries, the ratio of 73.32 deaths per thousand should excite no surprise. The largest number of patients under treatment at one time was 54 in 1872. The average number now is 25.

#### *U. S. Naval Hospital, Washington, D. C.*

The first naval hospital at Washington was established in a building near the navy-yard, rented for that purpose. The price paid



was \$200 a year. This was succeeded by the one established at the navy-yard, and which was discontinued in 1843, when the sick were transferred to the Marine Headquarters. Afterwards, the Civil War caused these accommodations to be insufficient, and on June 8, 1861, a temporary naval hospital was established in the "Government Hospital for the Insane" near Washington; certain wards having been "appropriated by the Secretary of the Interior for naval purposes." These wards continued to be used until October 1, 1866, and 1,488 patients were treated, with a recorded death-rate of 31.6 per thousand.

The increasing importance of the navy-yard, the number of naval vessels in the Potomac, the uncertainty attending the condition of war, and the disadvantages of having a naval hospital under the same roof with insane patients, induced Congress to appropriate \$25,000, on March 14, 1864, for the construction of a new building. The cost of work and material being then very great, additional appropriations had to be made, until the total aggregated \$115,000. The building was completed in July, 1866, and commissioned October 1st of the same year.

The grounds comprise three-fourths of an acre, and are situated near the navy-yard. About one-half was purchased June 4, 1821, and the remainder, March 30, 1865; the total cost being \$7819.50. They form a trapezium, bounded by the streets of the city, and enclosed by a handsome iron railing, and present with the building, walks, grass and trees, an attractive appearance.

The hospital is back from the street, fronts the south, and is 90 feet long and 60 deep. A part of the depth is made by small extensions back and front, so that the ground plan resembles a cross with short arms. It is built of brick, and includes a basement, two stories, and an attic under a mansard roof. The pitch of the basement is 9 feet, and of the two stories 14 feet. The rooms and wards open on corridors. A central hall, 10 feet wide, connecting back and front, is crossed perpendicularly by a narrower one extending the length of the mid-line. The corridors thus form a cross, and divide each floor into four sections (Plate XIII).

In the basement, the floor of which is somewhat below the ground level, are the apothecary's quarters, the kitchen, laundry, boiler room, coal-bunker, storerooms, bath-room and water-closets. On the first floor are offices, mess-room for the men, and quarters for all the medical officers on duty. On the second floor are dispensary,

officers' ward, nurses' room, and four wards for enlisted men. The two rear wards are  $18\frac{1}{2} \times 35$  feet, and the other two, one at each end of the front, are  $24 \times 22$  feet. They contain many windows, and have pine floors and painted plaster walls. The bath-rooms and water-closets on each floor are in the rear extension, which is 9 feet deep and 43 long. They contain good tubs, and well trapped bowls with overhead tanks. The sewer pipes connect with those of the city.

In spite of the plan of this building, the ventilation is remarkably good. The large number of windows, the walled duct under the hospital communicating at each end with the outside air, and discharging into stacks containing the steam pipes, and the ventilators throughout the building near floors and ceilings, accomplish an excellent result.

The water is from the city, but, as the pressure is insufficient, a steam pump is provided in the basement, to force the supply into two iron tanks placed in the attic. All the water is passed through a Loomis filter, to free it from the large amount of matter held in suspension. The building is heated by steam supplied from the boiler in the basement, and is lighted by gas from the city, but electric lights are now being introduced.

The present number of beds is 26, with an air space of 1392 cubic feet to each; but the average number of patients daily under treatment allows over 3000 cubic feet to each. The hospital was designed for 50 beds, with 1155 cubic feet of air to each. In 1871 there were 63 patients under treatment at one time. The staff consists of a Medical Director and a Passed Assistant Surgeon, both of whom reside in the building.

*"Sick Quarters," U. S. Naval Academy, Annapolis, Maryland.*

The United States Naval Academy, situated at Annapolis, Maryland, on the right bank of the Severn river, is separated from the city by a high brick wall, which, with the river, encloses more than 60 acres of ground. These are beautified with walks, lawns and ornamental trees, and contain the many buildings necessary for the school.

This school was established in 1845, on 9 acres of ground transferred to the Navy Department from the War Department, which had here a small fort. Additions have been made by purchase from time to time, until the present ample dimensions have been attained.

The hospital is near the south end of the main building, or "cadet

quarters," and was built in 1853, to take the place of a small two-story frame structure near the fort. It is a brick building, 42 feet wide and 67 deep, fronts the east, and consists of a half-cellar, three stories and attic. Originally much smaller, it was enlarged and altered in 1876, and again in 1886. The cellar has a depth of 7 feet, is well ventilated, and its floor is of concrete. The storerooms situated here are therefore dry and ample. On each story there is a wide central hall connecting back and front, and having rooms or wards on either side. Broad iron stairways connect the different floors.

The hall on the 1st floor is tiled, and ends in a rear vestibule, from which the back stairway ascends. This stairway well is connected with the water-closets and bath-rooms on each floor, and is shut off from the rest of the building by doors. Contagious disorders can thus be treated on the 3d floor without any communication with the other parts of the hospital.

It is true that a detached pavilion would be preferable, but the writer has known scarlet fever, mumps, diphtheria, and other communicable diseases, to be repeatedly treated here without any extension, thus apparently demonstrating the tendency of infection to confine itself to the horizontal plane.

The water-closets and bath-rooms are separated from the wards by doors and the staircase well. They have concrete floors and slate walls, two or more windows each, good tubs, and bowls well flushed from overhead tanks. All the fixtures are well trapped, and the sewer pipes connect with those from the "cadet quarters," and empty into the river near by. The first story has a pitch of  $8\frac{1}{2}$  feet, the second 12 feet, and the third 14 feet. On the first floor, on one side of the hall, is a large dispensary, communicating in the rear with a convenient laboratory, the dining-room, and nurses' room; on the other side is the officer-of-the-day's room, communicating in the rear with a waiting room, the kitchen, and dentist's room. The kitchen is only used to keep the meals hot before serving. All the cooking is done in the kitchen of the "cadet quarters." The laundry work is also done outside of the building in the main laundry. On the second story, the hall room is the operating room. This is lighted by three large windows occupying most of the walls, and contains the necessary appliances. On one side of the hall is the medical inspector's office and library, and two wards; on the other, two wards and the apothecary's room.

The third floor has a dark room and six wards, one of which is

called the board room, as the physical examinations of all the candidates for admission to the school and of all cadets are conducted there. The wards are all well supplied with windows extending nearly to the ceilings, and with ventilators near floors and ceilings, connecting with ventilating shafts. The attic is surmounted by a large ventilating cupola.

Electric call-bells are distributed throughout the building. Large steam radiators are in suitable places, and connection is made with the boiler-house, from which most of the houses in the grounds are heated. Gas is obtained from the Naval Academy tanks, and water from the city reservoir, five miles distant. The source of this water is a small stream fed by springs. It contains 4 grains of solids to the gallon, of which 2.5 are non-volatile.

The patients having accommodations in the hospital are chiefly cadets, of whom there are generally about 250 in the school. Officers connected with the academy have, as a rule, quarters within the grounds provided for them and their families.

There are, however, many enlisted men in the marine barracks and on the ships located here. Serious cases among these are admitted into the hospital, and indeed from this source is almost all the mortality—there not having been a death among the cadets at the academy for several years.

The medical officers on duty look out for the sick of over 1000 people, including many women and children. The official returns include, of course, only such cases as occur among the persons in the naval service. During the last 3 years there were 3059 cases treated; of these, 14 were invalided and 5 died; the causes of death being phthisis, suicide and tetanus. In 1890, out of 240 cadets, 172 were attacked with epidemic catarrh, but none of these cases ended fatally.

The staff consists of a medical inspector, a surgeon and two passed assistant surgeons. The hospital can accommodate 50 patients and furnish 3500 cubic feet of air space to each bed. The number in sick quarters is, however, as a rule much below this, and each one probably has not less than 5000 cubic feet of air.

In the spring and summer the broad verandas on each floor furnish to convalescents opportunities that are not neglected of remaining out-of-doors in good weather.

The mean annual temperature is 55° F., while that of summer is 76°, and winter 35°. The rainfall is about 45 inches. The atmos-



phere in summer occasionally furnishes a high degree of humidity, but the climate is remarkably good most of the year for a place situated on the Atlantic coast. There is a mild malarial influence in summer and early autumn, but it is only occasionally noticeable, as the grounds are kept in beautiful order and are well drained. Indeed, it may be said that few places furnish such grass and trees and opportunities for outdoor life.

*U. S. Naval Hospital, Norfolk, Virginia.*

After 1811 the sick on this station were treated in a temporary hospital established at the navy-yard. It was a very poor structure, and in a few years after its occupation was unfit for use, by reason of decay and other causes. It was not, however, until 1826 that the commissioners caused the various sites near Norfolk to be examined with a view to the erection of a permanent building. Craney Island was first selected, and its transfer from the War Department was secured in November of that year.

This site was not very satisfactory, and the conditions attached to the transfer not altogether agreeable. Therefore on January 8, 1827, a request was made to the Secretary of War, himself a member of the Board of Commissioners, to transfer Fort Nelson, near Norfolk, and the public land attached to it, to the Navy Department for hospital purposes. The transfer was made, and 25 acres or more of adjoining land were purchased for \$5000 from Col. Thomas Newton, then a member of Congress. The conveyance of the latter was not completed until November 29, 1827.

In December, 1826, a plan for the hospital had been accepted from John Haviland, an architect in Philadelphia, and the work was commenced early in 1827, under his personal supervision. He also made all the contracts for material and labor and was responsible for the payments. On July 17, 1830, the sick, together with all furniture and appliances, were moved from the temporary hospital at the yard to the one wing of the new building sufficiently completed. This transfer was effected by Surgeon Thomas Williamson, U. S. Navy, the first medical officer in charge of the present naval hospital at Norfolk. In 1832, after an expenditure of \$270,000, the building was still more or less incomplete, and indeed the work continued from time to time for several years.

The hospital is well located on the left bank of the Elizabeth river, opposite the city of Norfolk, and separated from the navy-yard by

the city of Portsmouth. The grounds comprise 80 acres, of which 50 in the rear of the building are covered by a pine forest, cleared of undergrowth and traversed by roads. The land in front is a broad stretch of lawn, ornamented by walks and trees, and surrounded by a sea wall terminating in a point projecting into the river 1000 feet away.

This hospital, constructed of granite, presents an imposing appearance; its basement and 3 stories being adorned by a portico 110 feet long and 17 feet wide, approached by broad stone steps, and containing 10 lofty Doric columns supporting a handsome entablature and pediment. The block plan was chosen, with a front of 195 feet facing the northeast, and two perpendicular wings extending 170 feet. The width of each is 44 feet, except for 123 feet of the wings adjacent to the front. Here the deficiency is supplied by an outside balcony on each floor. The fourth side of the square is occupied in part by a two-story annex, 60 feet long and 20 wide. This is joined to the wings by balconies that extend on every floor around the entire court.

All the wards are in the wings; each wing has eight on a floor, five being  $26 \times 15$  feet, and three  $35 \times 10$  feet. They all connect by arched openings forming alcoves on each side, and except on the third floor have vaulted ceilings with a maximum height of  $11\frac{1}{2}$  feet. Each has two opposite windows, painted wood floors and plaster walls. Each contains 4 beds and furnishes 1087 cubic feet of air and 98 feet floor space to a bed. (Plate XIV.)

A hall  $12\frac{1}{2}$  feet wide traverses the length of the floors of the main building, having the rooms in front. Stairs from these halls connect the various floors. On the 1st floor are offices, reception-room, and officers' dining-room. On the 2d floor are quarters for resident officers and for sick officers. On the 3d floor are storerooms, apothecary's room and quarters for employés. The nurses' rooms are in the wings, one at each end of the row of wards in the narrower portions, with water-closets opposite, and stairs connecting the different stories. These closets are used only by special cases, as the main water-closets are in the annex, where also are the smoking-rooms, wash-rooms, and barber-shop. In the general basement are kitchen, laundry, mess-room, storerooms and quarters for employés.

The court covers large cisterns, into which water is pumped from a deep well extending into a natural underground current supplying 30,000 gallons daily. There are also large iron tanks on top of the annex for storing this water. The pump and boiler-house are in the

rear. Steam is supplied for heating the building, for the pumps in storing water, and in connection with a perfect fire system. Ventilation is accomplished by doors and windows; the long summers and mild winters allowing a free circulation of air most of the time.

The sewer system is complete and independent. All fixtures are trapped and the abundant supply of water allows frequent flushing. The pipes discharge into the river north of the building.

A number of electric lamps supply light; though, of course, the gas fixtures are retained, and connection with the gas-works of the city of Portsmouth.

Well situated in the midst of pine trees is a frame building used for contagious diseases. There are also, of course, the usual out-houses, such as woodsheds, stables, greenhouse, and boathouse.

To the south is a good residence for the medical director in charge. His assistants, a passed assistant surgeon and two assistant surgeons, reside in the main building. The south wing of the hospital is not used, as the average number daily under treatment is 30. This hospital was, however, designed for 200 beds.

During the last 3 years 593 patients have been treated.

The climate is rather debilitating in summer, on account of the high temperature; though at night during this period there is generally a pleasant breeze, allowing refreshing sleep. The spring and autumn are delightful, and the winters, as a rule, mild; though snow and ice are common in January and February.

In the early autumn, cases of malarial fever are not infrequently admitted from the navy-yard, and typhoid fever is not rare in the cities. Pulmonary troubles do better than in any of the other naval establishments, and patients are occasionally transferred here for that reason.

The increasing importance of the Norfolk navy-yard, and the large number of naval vessels seeking these waters, make it very desirable to have a hospital so delightfully situated, and so entirely free from epidemic influences.

#### *U. S. Naval Hospital, Pensacola, Florida.*

This hospital is a light frame structure, situated three-quarters of a mile to the west of the navy-yard. The hospital and the navy-yard, with the little village of Wooster at its north, and the larger straggling village of Warrington at its west, are on the naval reservation, 5 miles by water southwest of the city of Pensacola. This

reservation is part of the ungranted Spanish royal domain, which became the property of the United States by the treaty of 1819, ratified by Spain in 1821. Florida ceded its jurisdiction over this tract to the United States in 1845. The coast here forms an angle that includes the reservation, the south and east sides of which are both on the Bay of Pensacola, while the Grand Bayou, formed by an arm of the bay extending west, forms the north boundary of the "reserve." The apex of the angle is called Tartar Point, and it is here that the navy-yard is situated. The soil is white sand, sparsely covered with grass. The trees are pine, and water and live oak.

In seeking a site for the hospital, the higher ground at the west of the naval reserve was selected, and 15 acres were set apart by high brick walls. The building is 566 yards from the bay, and 42 feet above sea-level. It is a simple pavilion of five wards arranged in a row. Each ward has five beds, with 1047 cubic feet of air to a bed. This simple structure is 126 feet long and 30 wide, is surrounded by a balcony, and faces the south. The surgeon's house, near by, and to the west, has much the same appearance, and is but little smaller. In addition to his quarters it contains two rooms for sick officers. These rooms have each 2260 cubic feet of air space.

The two buildings, with their kitchen in common, were completed in October, 1875, by R. E. Anson, contractor, at a cost of \$18,872, and were immediately occupied. They occupy the site of the old hospital destroyed by fire during the Civil War. Reminders of the old structure can be found in the remains of such outhouses as the mortuary, bakery, laundry and engine-house. Since the building of the hospital, nothing has been done to improve the grounds by repairing or taking away these old relics. This is probably due to the relatively small importance of the institution. The sick of the fleet seek the northern hospitals, and the navy-yard is now one chiefly in name. Money, however, is expended in the way of preservation, and the hospital is kept clean and ready for emergencies.

The ventilation is very good, as, in addition to windows and fire-places, there are doors provided with transoms, and in the ceiling of each ward are two movable blind ventilators. These latter open into the attic, which is ventilated by stationary blinds. The water supply is provided for by a cistern in which is collected the rain water from the shingle roof of the surgeon's quarters. The annual rainfall is 90 inches.



A portion of the grounds in front of the buildings is low, and here collect the drainage waters from the slope to the west around Fort Barrancas, and the opposed slope of the hospital grounds. The result is a sluggish pond, 210 feet long. The warm climate and the decaying vegetable growth so near the hospital furnish, in the early fall, conditions not favorable to the health of the locality. The winters are very mild, giving but little frost, and the summers are long and exceedingly hot. July and August are the warmest months, but September is probably the most debilitating. The mean annual temperature is nearly 70 degrees F., and the range in 1880, an exceptional year, was between 118 degrees and 7 degrees.

The prevailing diseases are intestinal and malarial. Yellow fever is an occasional visitor—the years 1863, 1867, and 1875 and 1883 marking some of its visits. This disease is not indigenous, but sometimes passes from the quarantine station to the southeast on the long island of Santa Rosa. The hospital has no separate building for such cases, and in 1883, eight were treated in the wards.

The staff consists of one surgeon, who, in addition to hospital duties, does much work among the poor of the two villages. The navy has supplied only 271 cases since the hospital was commissioned in 1875. Of these, 12 died (6 from yellow fever), 209 were discharged to duty, and 50 were invalided. During a part of 1888 there was not an unoccupied bed, as 24 patients were under treatment at one time. But during the last four years there have been only 14 sick, as the naval force at the yard has been reduced to a minimum.

*U. S. Naval Hospital, Mare Island, California.*

The naval station of the United States on the Pacific is Mare Island, a tract of land acquired by the government on January 4, 1853, at a cost of \$83,000. It is situated 25 miles from the city of San Francisco, on San Pablo Bay, the northern extension of San Francisco Bay, and was originally a grant to Señor Castro, who parted with it for money, as several others did before its final purchase.

This island is very extensive if all the marsh land be considered, but only 930 acres are at all suitable for naval purposes. These include the rolling land, forming approximately an ellipse, comprising the southern portion. The long axis of this is  $2\frac{1}{4}$  miles, extending northwest and southeast, while the short axis is  $\frac{1}{2}$  of a mile.

Between the island and the town of Vallejo on the mainland is the Mare Island Strait. At the southern extremity (the Carquinez Strait) the waters of the Sacramento and San Joaquin rivers empty into the bay. The formation of this part of the island is sandstone, covered by  $2\frac{1}{2}$  feet of black loam. The climate and soil have been so favorable to the cultivation of trees and flowers that the island has become celebrated even on that coast.

Soon after the purchase, the navy-yard was established on the side opposite Vallejo, the intervening waters furnishing a quiet anchorage for ships of any size. A building was set apart for "sick quarters," and for storing medical supplies for the squadron and station. This is employed now as the dispensary and surgeon's office of the yard; the large number of officers and workmen requiring medical and surgical assistance near at hand. It ceased to be used as "sick quarters" when the present hospital was completed in 1870.

This hospital has an isolated position outside and to the south-east of the yard, being one mile from the workshops, and on a slope facing Mare Island Strait, and ending in an intervening marsh. It is 66 feet above low water, and consists of a central structure, and two pavilions terminating in small transverse buildings. It fronts the east and is 250 feet long. It is built of brick, and has a basement, two stories, and an attic under a mansard roof. The spaces in front between the projecting central structure and the transverse portions of the pavilions are occupied by broad verandas on each floor. Each floor of a pavilion is a ward; the transverse projection containing bath-room and water-closet.

Each ward is 68 feet long, 24 wide, and 15 high, and contains twenty beds between windows, and furnishes over 1200 feet air space and 81 feet floor space to each. There is an open fireplace near each end, 10 windows on both opposite sides, and an end window. The windows are  $9\frac{1}{2}$  feet high, and extend within 3 feet of the ceiling. The floors are painted Oregon pine, and the walls painted plaster. Fresh air is admitted by openings near the floor, connecting with ducts. A current is induced by ventilators near the ceiling communicating with large Emerson ventilators opening above the roof and provided with steam coils. The water-closets and bath-rooms are in the transverse projections on opposite sides of the wards. They are included in the ventilating system, have concrete floors, windows and all modern improvements.

The basement has  $5\frac{1}{2}$  feet of its pitch below the ground level. It

contains mess-room, reading-room, kitchen, storerooms, and quarters for employés. The floors of the central building contain offices, resident medical officers' quarters, rooms for sick officers and for special cases, operating rooms, and apothecary's room. (Plate XV.)

The whole building is heated by steam and lighted by electricity. The sewer system is independent. All fixtures are well trapped, and the pipes join the 10-inch sewer in the rear, which connects with a well ventilated brick sewer nearly 500 feet long, emptying at an inclination of one foot in forty into the adjacent waters.

The steam laundry, drying-room and boiler are in a building 140 feet south of the hospital. In an annex to this is the mortuary. The boiler supplies steam for heating the building, and for forcing water into the iron tanks under the hospital roof. Water is obtained from the water-works of Vallejo and from the reservoir on the island. The latter holds 13,000,000 gallons of rain-water, but this supply is regarded as a reserve: the large number of people living on the island making it unadvisable to trust entirely to the connection with Vallejo.

The staff consists of a medical director, who is provided with a delightful residence, a surgeon and a passed assistant surgeon. Patients are received from the Pacific and Asiatic squadrons, from the station, and the Yokohama hospital. The 80 beds are, however, rarely filled, as the average number of patients daily under treatment is about 40. During the last three years 581 cases have been treated.

The climate is regarded as salubrious. During six months of the year there is almost no rain. The rainy season begins in May and lasts until October, though during this period there are usually considerable periods of fine weather. The mean annual temperature is 57° F. The thermometer occasionally falls to 28° in January, the coldest month. In summer there is a period of northwest winds, fogs and dust, that produces influenza and various respiratory troubles. Malarial influences are rarely noticeable, and epidemics unknown.

#### *U. S. Naval Hospital at Yokohama, Japan.*

This beautiful little establishment, constructed in 1872, and commissioned on May 16 of that year, accommodates 34 patients, including 8 officers. It is delightfully situated amid the residences of the foreign population, and near the English and German naval hospitals, on the bluff southeast of the main or lower section of the city of Yokohama.

It consists of a main quadrangular building of two stories and two detached buildings of one story. One of these, called the wing, is situated to the east and rear, so that its front is nearly on a line with the rear of the main building, with which it is connected by an outside passage. The other building, containing the dining-room, kitchen, pantry, cooks' room and store-rooms, is nearly 30 feet in rear of the main portion, and is connected with the wing by a passageway. The whole hospital is constructed of tile and plaster, fronts the south, and is nearly surrounded by verandas on all stories.

A smallpox hospital, with a disinfecting chamber near by, is 110 feet from the main building, and near the northwest limit of the grounds. It is a one-story building, containing a ward  $25 \times 54$  feet, and two rooms  $14 \times 15$  feet. The ward has 8 windows and a door, and contains 18 beds, with only 644 cubic feet of air space to each. Each room has 3 windows, a door and two beds, with 987 cubic feet to each bed. All these doors are  $87 \times 41$  inches, and the windows are  $58 \times 85$  inches.

The main building is 85 feet long and 35 feet deep. On the first floor are quarters for the resident medical officer, offices, dispensary, bath-room and water-closets. On the second floor is a ward containing 8 beds, with 902 cubic feet to each; 4 rooms, having 2 beds each, for sick officers, with 1200 cubic feet to each bed, and 2 rooms for nurses. The ward has 4 windows and 3 doors, and each room 3 windows and a door. The windows are  $87\frac{1}{2} \times 45\frac{1}{2}$  inches, and the doors  $88 \times 38$  inches.

In the wing are the main ward,  $54 \times 24$  feet, and nurses' rooms and water-closets. The ward contains 18 beds with 1717 cubic feet to each. It is lighted by 8 windows, each  $76\frac{1}{2} \times 43$  inches, and has 4 doors  $83\frac{1}{2} \times 47$  inches each. The water-closets all have earthen jars under the seats, which are removed from the outside of the building every night.

The grounds contain  $1\frac{1}{2}$  acres, and are shaped somewhat like an arrowhead with blunted barbs. They are beautified with grass plots, trees, walks, and a pretty shaded mound 20 feet high. East of the wing is the residence of the medical officer in charge.

The ventilation of this hospital is good, as the many windows and doors are assisted by the badly fitted woodwork. All the buildings and grounds are lighted by electricity. Water is obtained from a well, and by storing rain-water in large iron tanks. The well is 67 feet deep, and furnishes an ample supply of water containing  $13\frac{1}{2}$



grains of solid matter to a gallon—silicic acid, chloride of sodium, carb. magnesium, sesquioxide of iron, and sulphate of calcium (trace). All drinking water is filtered, and in the summer months boiled. The rooms and wards of the main building have open fireplaces, but these being inadequate, stoves are employed.

The staff consists of a surgeon and a passed assistant surgeon. The employés are the apothecary, watchman, two cooks, a gardener, and four coolies. Two of the coolies do the cleaning and act as nurses; the other two are laborers. They have detached quarters. The watchman acts also as night nurse, and the cooks also set the tables. The gardener is also a carpenter and gatekeeper. The apothecary, in addition to usual duties, superintends nurses and issues stores.

The daily average of patients last year was 10. The patients come entirely from the fleet, and many of the diseases originate on the coast of China. Venereal troubles, of course, play their part, diarrhoeal and malarial disorders are not uncommon, and smallpox is an occasional visitor.

Yokohama itself furnishes a certain number of cases, as the vessels of the navy pass much of the year there, to escape the debilitating summer of the south. This city, frequently spoken of as a desirable sanitarium, has a delightful climate, though July and August have a mean temperature of 80 degrees F. with a minimum of 70 degrees F. January, the coldest month, has a mean of 38 degrees and a minimum of 30 degrees. The dew-point in January is 30, and in July and August is 70. The annual rainfall is 50 inches. The prevailing winds in May, June and July are southeast, and during the rest of the year northeast. The main portion of the city is intersected by numerous canals, and has northwest of it many rice fields which are frequently flooded. Malarial disorders are therefore common, but on the bluff this influence is not noticeable.

Variola is present all the time, and occasionally becomes epidemic, beginning among the native population. Rubeola, frequently attacking adults, is also occasionally epidemic. There is also a disease among the natives known as kakke, and considered identical with beri-beri.

#### *Closing Remarks.*

The subject is far from a conclusion. England, France and the United States are only *three* of the many nations who send their sons upon the sea as warriors. Austria, Brazil, China, Germany, Italy, Russia, Spain, Turkey and others, represented by 2000 ships of war

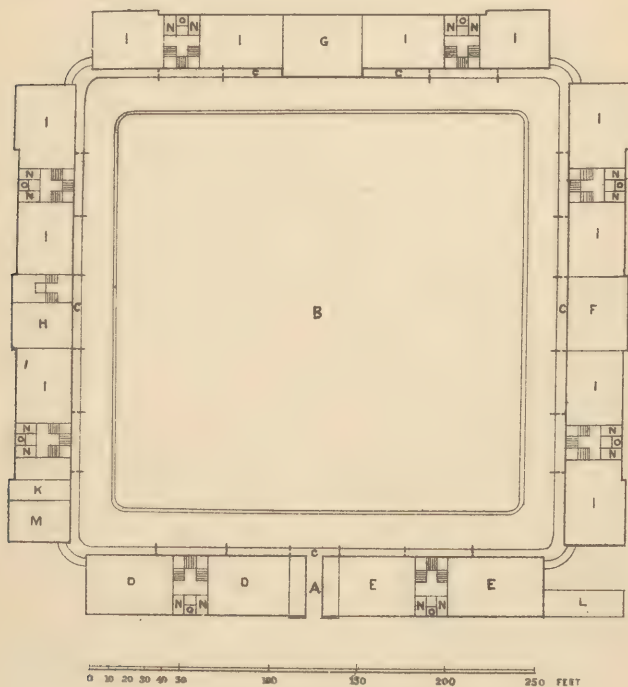
with 200,000 men, have established naval hospitals well worthy of study. These institutions furnish a part of the histories of these countries and offer to him who seeks, much of interest and profit. Yet they cannot be considered here, as an apology is due for the many pages already written. This apology is found in the little attention *these* important hospitals have received from the various writers on that subject.

#### DISCUSSION.

THE CHAIRMAN.—The Section is very greatly obliged to Dr. Gatewood for this paper, which is valuable from an historical point of view, and for permanent consultation when published. The paper is accompanied with plans of a number of French, English, and American naval hospitals; and it would be very desirable if this could be completed for other nations, as Dr. Gatewood suggests, because, so far as I know, there is no treatise or article upon naval hospitals which is complete.

# GROUND PLAN OF NAVAL HOSPITAL, YARMOUTH—310 BEDS, *exclusive of Sick Officers Accommodation*

PLATE I.



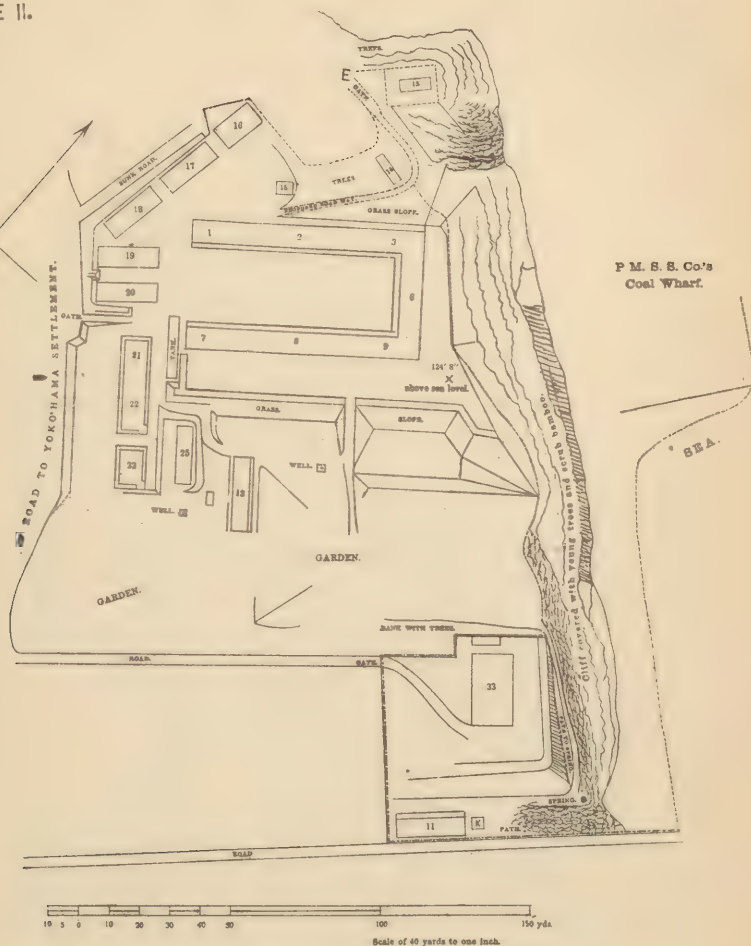
- |   |   |           |                              |
|---|---|-----------|------------------------------|
| A | Entrance archway.   | H         | Committee room, surgery, &c. |
| B | Garden.   | I, I, &c. | Wards, 1/4 beds each.        |
| C | Open arched corridor, one story high, surrounding the garden. | K         | Padded room.                 |
| D | Rooms for sick officers.                                      | L         | Bath rooms, washhouse, &c.   |
| E | Steward's stores.   | M, M      | Sculleries.                  |
| F | Chapel.   | N, N      | Nurses' rooms.               |
| G | First floor, operating theatre; ground floor, billiard room.  | O, O      | Waterclosets.                |





# ROYAL NAVAL HOSPITAL, YOKOHAMA.

PLATE II.



KEY TO PLATE II.

- |   |  |
|---|--|
| 1, 2, 3, 6. General Wards.                  | 17. General Cook and Bath House.                                     |
| 7. Gun-room and Engineer's Ward (rooms).    | 18. Nurses' Quarters, Clothing Store, Coal Store and Larder.         |
| 8. Warrant Officers' Ward (rooms).          | 19. Steward's Quarters and Bedding Store.                            |
| 9. Non-commissioned Officers' Ward (rooms). | 20. Dispensary, Survey Room, and Provision Store.                    |
| 11. Contagious Ward.                        | 21, 22. Senior Medical Officer's House.                              |
| 12. Ward-room Officers' Ward (rooms).       | 23. Second Medical Officer's House.                                  |
| 13. Mortuary.                               | 25. Servants' Quarters, Kitchen, Stores, etc., for Medical Officers. |
| 14. Latrine.                                | 33. Contagious Ward.   |
| 15. Fire-engine House.                      | K. Kitchen, Disinfecting Rooms, etc.                                 |
| 16. Quarters for Natives.                   |  |

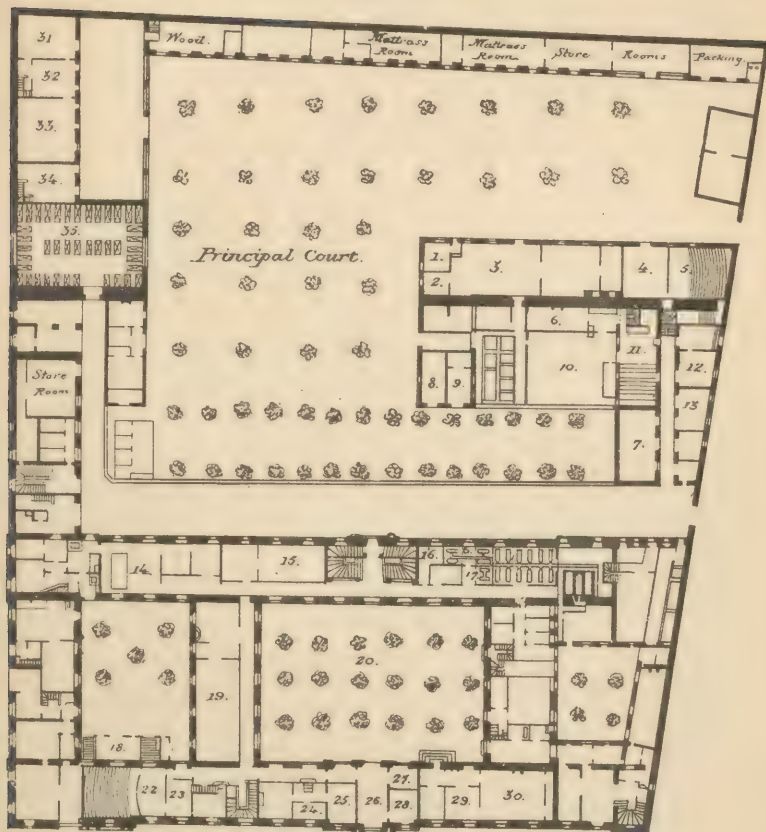








—BASEMENT.—



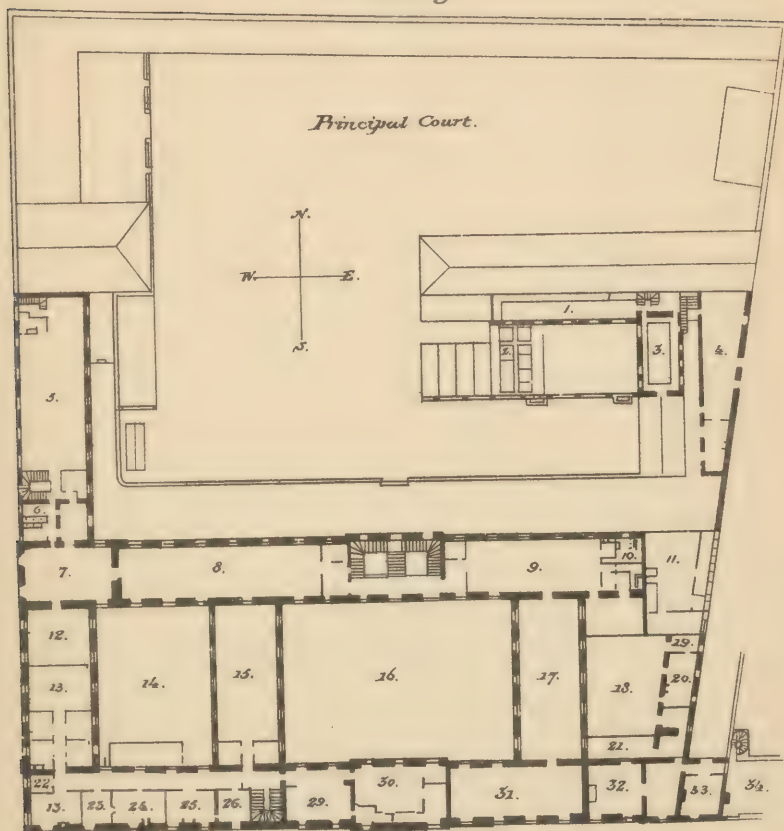
KEY TO PLATE IV.

- |                                   |  |
|-----------------------------------|--|
| 1. Bureau of Pharmacy.            | 17. Baths.                                 |
| 2. Office of Apothecary-in-Chief. | 18. Laboratory.                            |
| 3. Laboratory.                    | 19. Grand Pharmacy.                        |
| 4. Mortuary Chapel.               | 20. Court.                                 |
| 5. Anatomical Lecture Room.       | 21. Court of Sisters of Charity.           |
| 6. Chemical Room.                 | 22. Lecture Room on Practice of Medicine.  |
| 7. Dissecting Room.               | 23. Professors' Cabinet.                   |
| 8. Mineralogical Room.            | 24. Control.                               |
| 9. Botanical Room.                | 25. Office of Entries.                     |
| 10. Garden.                       | 26. Entrance.                              |
| 11. Chemical Lecture Room.        | 27. Guard Room.                            |
| 12. Dead Room.                    | 28. Sentries' Room.                        |
| 13. Professor of Anatomy.         | 29. Office of Director.                    |
| 14. Cuisine.                      | 30. Council Room.                          |
| 15. Linen Room.                   | 31, 32, 33, 34. Rooms for arranging Linen. |
| 16. Surgeon on Duty.              | 35. Sleeping Room of Attendants.           |



*Naval Hospital, Toulon*

*2<sup>nd</sup> Story.*



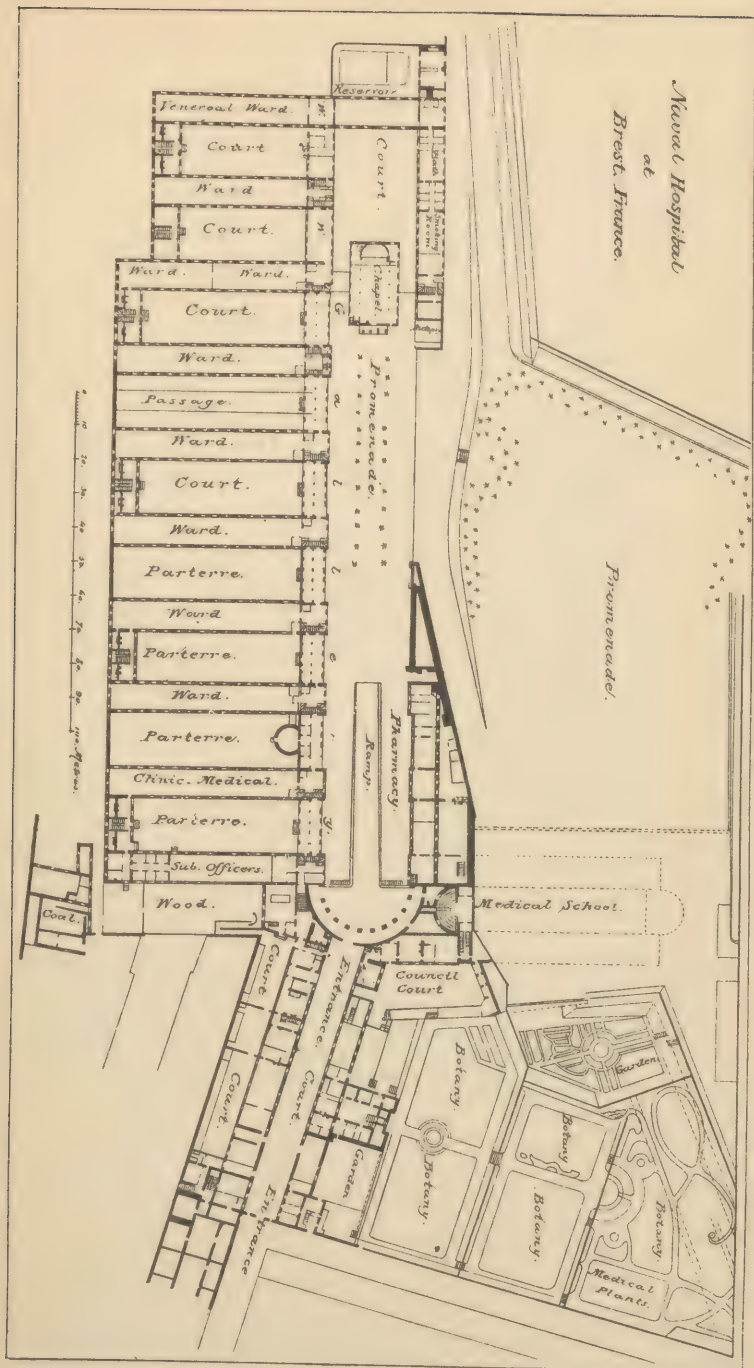
KEY TO PLATE V.

- |  |                                  |
|--|----------------------------------|
| 1. Museum.                             | 17. Ward.                        |
| 2. Basins for Leachers.                | 18. Court for Sisters of Mercy.  |
| 3. Lecture Room for Chemistry.         | 19. Pharmacy for the Sisters.    |
| 4. Anatomical Collections.             | 20. Chamber for the Sisters.     |
| 5. Ward.                               | 21. Gallery.                     |
| 6. Water-closets.                      | 22. Office.                      |
| 7. Ward.                               | 23. Salle-a-Manger.              |
| 8. Ward.                               | 24. Room for Pupils.             |
| 9. Ward.                               | 25, 26. Superior Officer's Room. |
| 10. Water-closets.                     | 27, 28. Cabinet.                 |
| 11. Storeroom Pharmaceutical Utensils. | 29. Cabinet of Natural History.  |
| 12. Room for Confinement of Patients.  | 30. Library.                     |
| 13. Officers' Room.                    | 31. Ward.                        |
| 14. Court.                             | 32. Chapel of the Sisters.       |
| 15. Ward, Medical Clinic.              | 33. Room for the Sisters.        |
| 16. Large Court.                       | 34. Superintendence.             |





Naval Hospital  
at  
Brest, France.





# Hôpital maritime de St Mandier.

Jardin Botanique.

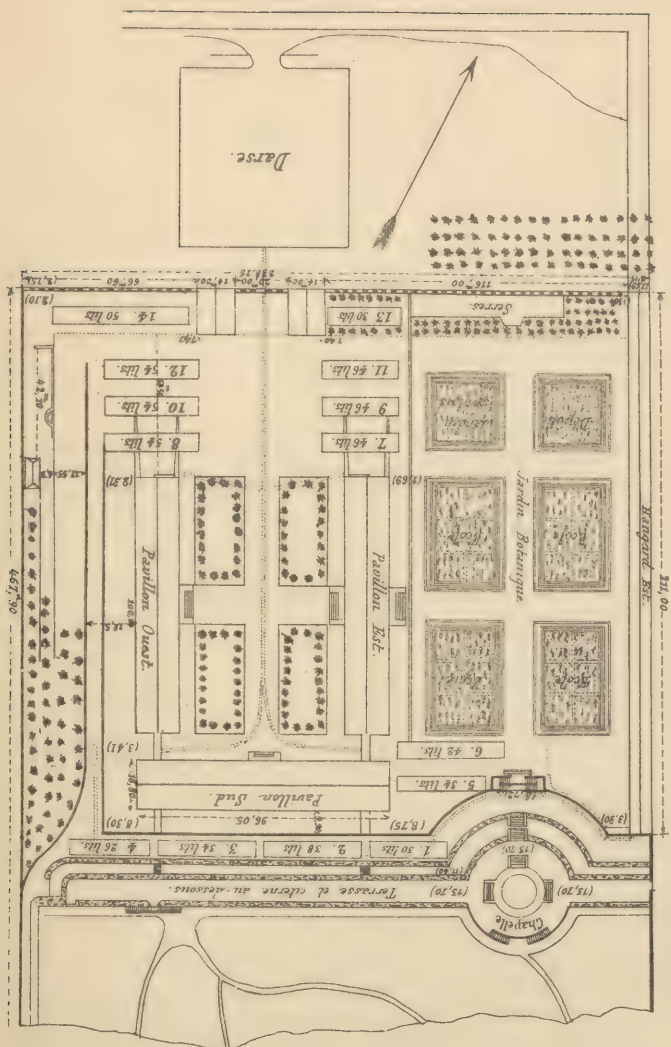






PLATE VIII.

# Cherbourg. Nouvel hôpital maritime.

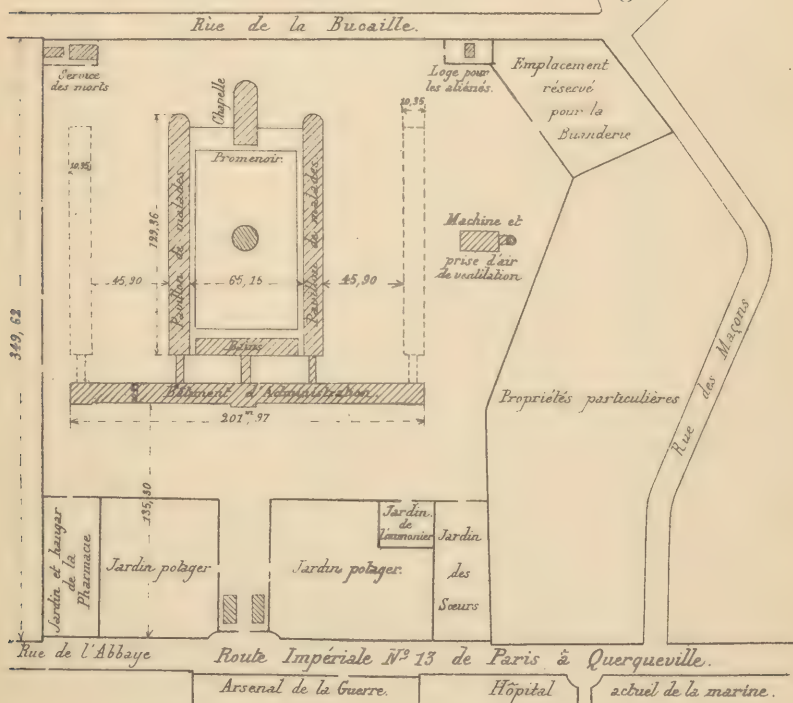
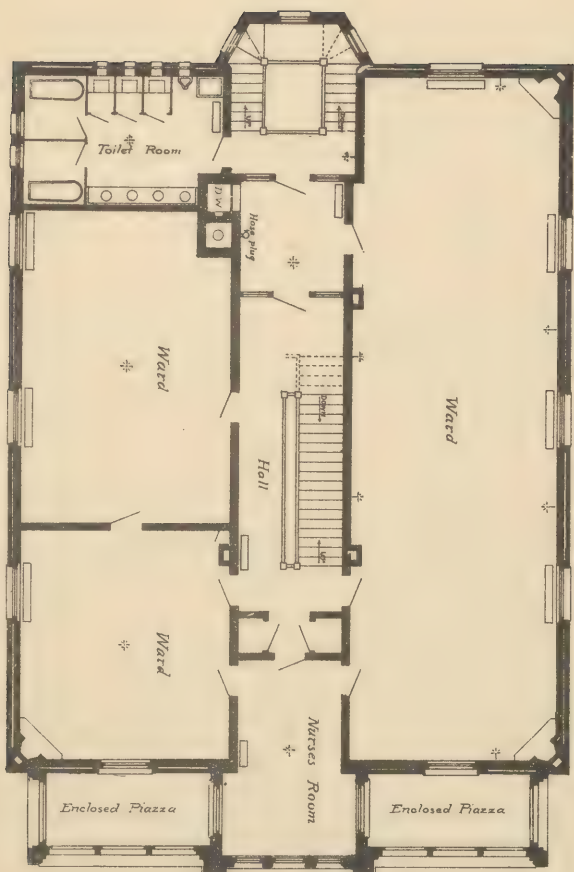




PLATE IX.

U.S.N. HOSPITAL  
AT  
Portsmouth N.H.



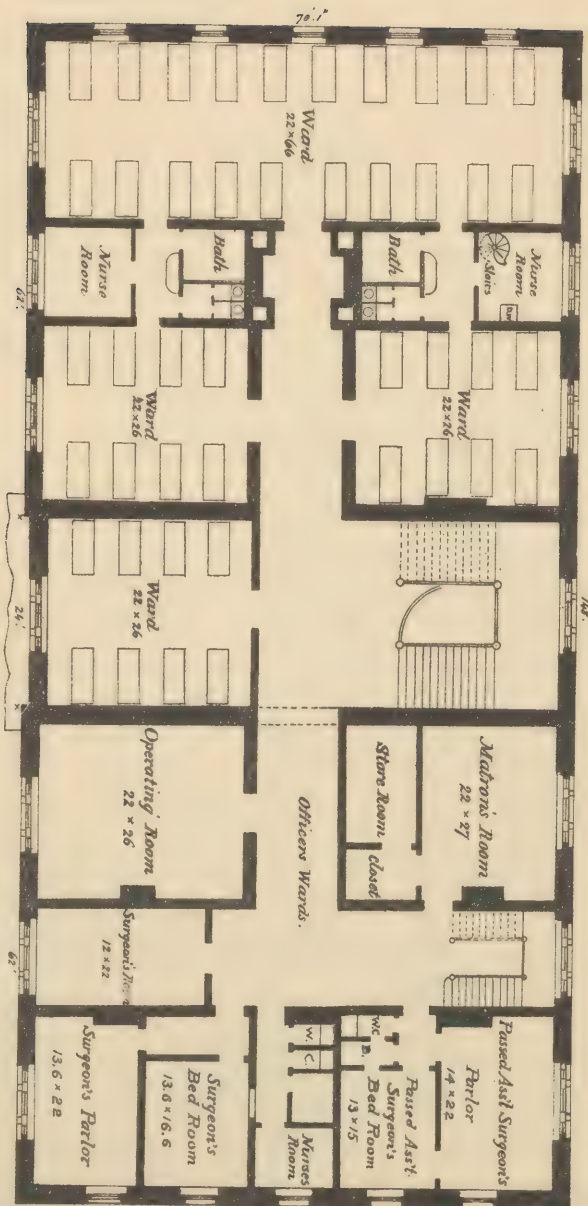
2<sup>d</sup> FLOOR —  
1/6





# U.S. HOSPITAL, CHELSEA.

## 2<sup>d</sup> FLOOR.





U.S.N. HOSPITAL, — BROOKLYN.

[illegible]









# U.S. NAVAL HOSPITAL, WASHINGTON.

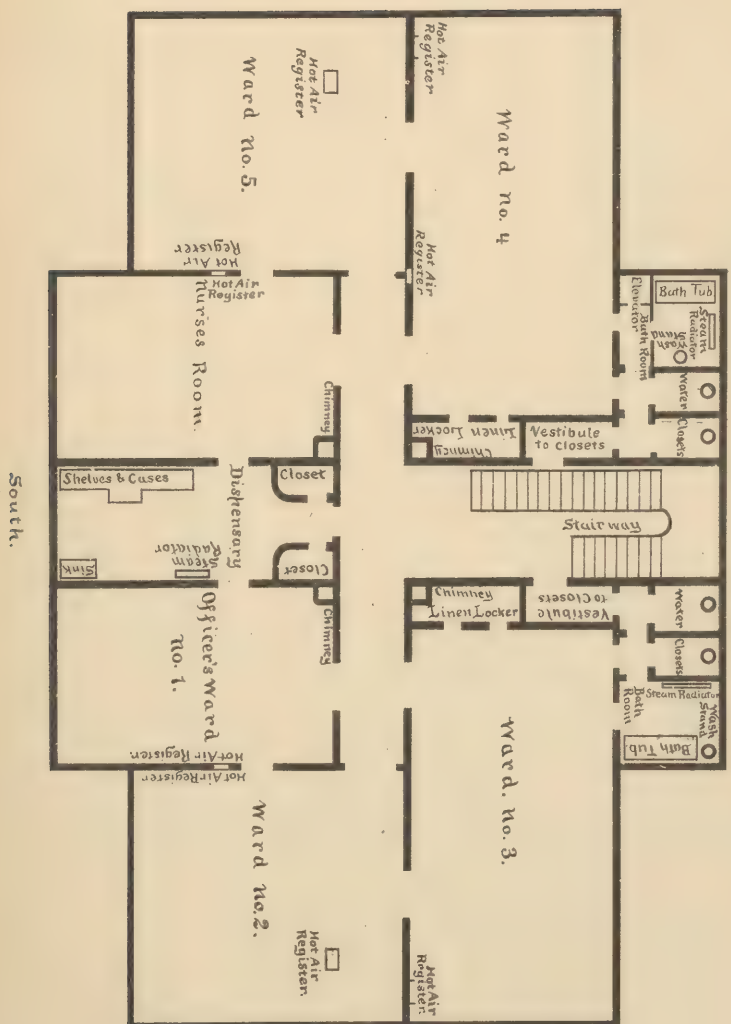
—2D Floor.—

PLATE XIII.

North.

West

East



South.



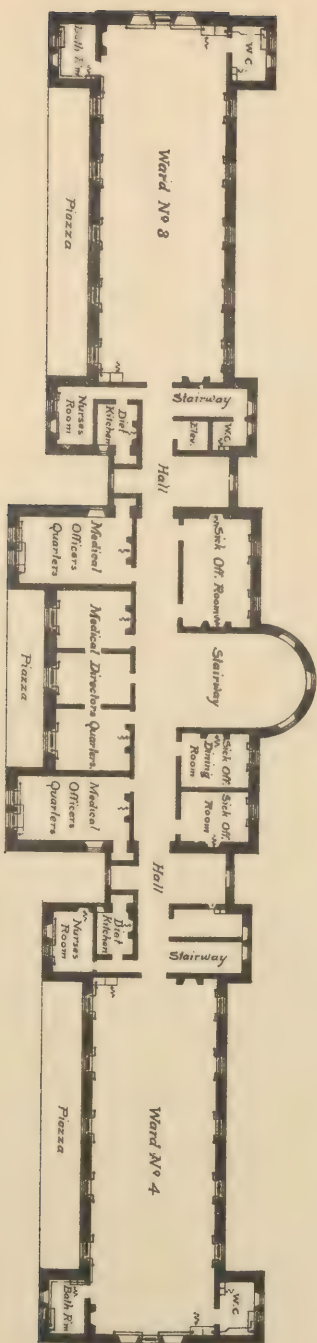






PLATE XV.

# U.S.N. HOSPITAL AT Mare Island Cal.



— 2<sup>nd</sup> FLOOR —

0 10 20

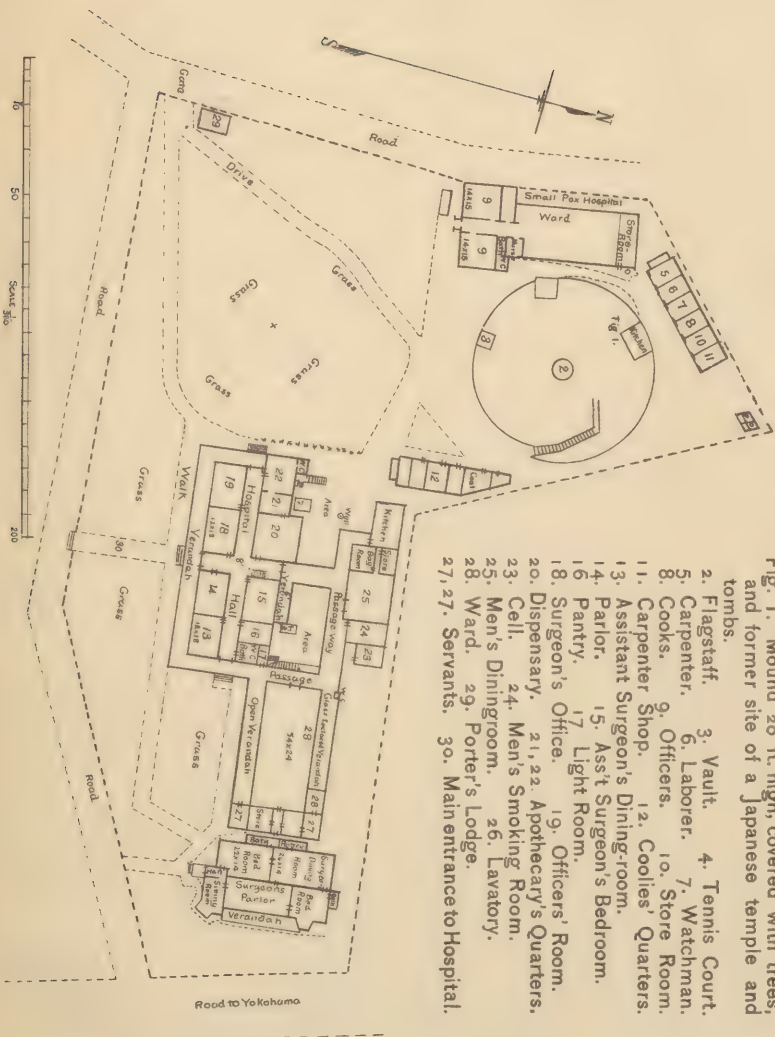


# PLAN OF THE U. S. NAVAL HOSPITAL AND GROUNDS, YOKOHAMA, JAPAN.

PLATE XVI.

Fig. 1. Mound 20 ft. high, covered with trees, and former site of a Japanese temple and tombs.

2. Flagstaff.
3. Vault.
4. Tennis Court.
5. Carpenter.
6. Laborer.
7. Watchman.
8. Cooks.
9. Officers.
10. Store Room.
11. Carpenter Shop.
12. Coolies' Quarters.
13. Assistant Surgeon's Dining-room.
14. Parlor.
15. Asst Surgeon's Bedroom.
16. Pantry.
17. Light Room.
18. Surgeon's Office.
19. Officers' Room.
20. Dispensary.
- 21, 22. Apothecary's Quarters.
23. Cell.
24. Men's Smoking Room.
25. Men's Diningroom.
26. Lavatory.
28. Ward.
29. Porter's Lodge.
- 27, 27. Servants.
30. Main entrance to Hospital.











JUL 11 1946

NATIONAL LIBRARY OF MEDICINE



NLM 00101655 4